JPRS-UST-86-007

24 February 1986

USSR Report

SCIENCE AND TECHNOLOGY POLICY

FBIS FOREIGN BROADCAST INFORMATION SERVICE

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-UST-86-007

24 February 1986

USSR REPORT

SCIENCE AND TECHNOLOGY POLICY

CONTENTS

ORGANIZATION, PLANNING AND COORDINATION

ROLE OF STANDARDIZATION IN TECHNICAL PROGRESS

Moscow STANDARTY I KACHESTVO in Russian No 9, Sep 85 pp 3-8

[Article by Chairman of the USSR State Committee for Standards, doctor of technical sciences G.D. Kolmogorov: "Standardization and Technical Progress"]

[Text] The 60th anniversary of the introduction of state standardization in our country is in September 1985. This anniversary is being celebrated at a significant time for the history of the party and the Soviet state--intense preparation for the 27th CPSU Congress is underway: a new version of the party Program and By-Laws is being prepared for approval, a national discussion of the plans for the next five-year plan and the more distant future is taking place.

The April (1985) CPSU Central Committee Plenum, which adopted the decision on the convening of the 27th congress, posed the task to concentrate the efforts of party organizations and labor collectives during the precongress campaign to hear reports and elect new officials on the solution of the key problems of economic and social development, having named as first among them the utmost intensification of production on the basis of the extensive introduction of the achievements of scientific and technical progress.

In the report of General Secretary of the CPSU Central Committee M.S. Gorbachev at the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress on 11 June 1985 it was stated: "The party regards the acceleration of scientific and technical progress as the main direction of its economic strategy and the basic lever of the intensification of the national economy and the increase of its efficiency and, hence, the solution of the most important social problems."

For the acceleration of scientific and technical progress the party is making the appeal to use all reserves and assets and, first of all, those which yield the quickest and most effective return.

The 60-year course of the development of Soviet standardization attests that standardization is one of these reserves. Its most conspicuous achievements are connected with the most important national economic tasks which were accomplished at various stages of the economic development of the country.

In the 1920's this was the combating of dislocation in industry. During this period standards contributed to the implementation of important organizational and efficiency measures: they predetermined the introduction of standardized types and unified dimensions of items, helped to carry out the item specialization of enterprises, and established requirements which were mandatory not only for state, but also cooperative industry and trade (and private industry and trade, which still existed at that time). Standardization of the 1920's prepared the standard technical base for the transition to the period of renovation.

At the end of the restoration period and at the beginning of the period of renovation the basic directions of the work on standardization in industry, such as typification, which was aimed at the rationalization of the assortment of machines and their components, and in subsequent years at the specialization of production, took shape, dimensional standardization and, finally, the standardization of the indicators of product quality underwent development.

The importance of standardization for technical progress and for the carrying out of the industrialization of the country was established precisely during this period.

In an editorial, which was published in 1930 in the third issue of the journal VESTNIK STANDARTIZATSII, it was stated: "Standardization is the basis of technical progress and, therefore, it should become a 'compass' in the technical updating of the national economy. A standard is not a fixed pattern which is taken once and for all, there is nothing more incompatible with the progress of technology than a dead plan, than immobility. The standard, the type or norm, is not in the least a hindrance of progress, on the contrary, the standard should lead 'today' and in this sense it is a motive force of creative thought in a specific, systematically taken direction."

The history of Soviet standardization gives a large amount of evidence of its influence on the acceleration of the progress of various sectors of industry.

One of the most convincing examples is the role of standardization during the years of the Great Patriotic War. The designers of Soviet combat equipment testified that standardization, typification, the extensive use of standard designs, and the system of the assurance of interchangability, which was developed during the prewar years, helped in a short time to place into production and to ensure the mass output of the latest types of weapons under the conditions of an unprecedented shortage of manpower and material resources.

Of course, the years of the postwar restoration and development of the national economy and the years of the subsequent peaceful five-year plans are a part of the 6 decades of the history of Soviet standardization. The contribution of standardization to industrial construction and to the development of new advanced sectors of industry--radio engineering, electronics, atomic energy--is well known. Precisely those achievements of standardization, which make it possible to speak about it as a means of the intensification of production and the acceleration of technical progress, are

especially important. The development of sets of organizational methods standards, the use of the comprehensive standardization and certification of products, the standardization of the methods of checking and tests, the systematic making of the quality indicators more strict--all this demonstrated the practical possibilities of standardization and served as the base for the further development of advanced changes in the national economy, which found reflection in decisions of the party congresses and in directive documents of the party and government. The decrees of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality" (1979) and "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" (1983) and the decree of the USSR Council of Ministers "On the Organization of Work on Standardization in the USSR" (1985) contain specific assignments on standardization for ministries and departments, which are connected with the most important problems of the improvement of the management of the national economy and the acceleration of the introduction of new equipment and technology and new forms of the organization of production.

The main thing, at which the party and government are aiming us, is the strengthening of the effective, active influence of standards on the assurance of the output of products which conform in their technical and economic indicators to the highest world level.

In recent years, in fulfilling the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy," the USSR State Committee for Standards has carried out a number of most important operations on:

--the introduction of long-range standards with indicators, which conform to the achieved world level or exceed it;

--the assurance of the cooperation and the coordination of the operations of the USSR State Committee for Standards, the USSR State Planning Committee, and the USSR State Committee for Science and Technology on the improvement of the planning of standardization;

--the broadening and intensification of the intersectorial specialization and cooperation of production in machine building on the basis of the maximum standardization of assemblies and parts;

--the development of a system of the devising and delivery of products to production, the improvement and simplification of the procedure of drawing up and getting agreement on planning, design, and technological documents;

--the assurance of the economy and efficient use of materials when developing new types of equipment;

--the improvement of the mechanism of certification, the introduction of product certification, and the further development of state tests;

--the increase of the influence of state supervision on the increase of the technical level and quality of products.

However, this is just the beginning. Each of the indicated directions should undergo further development and should find the optimum organizational forms.

Standards With Long-Range Demands

The use of a standard technical document of a fundamentally new type--the standard which establishes long-range demands on groups of similar products--is a most important means of strengthening the influence of standards on the increase of the technical level and quality of products.

The formulation of such standards should be carried out on the basis of fundamental, basic, and applied scientific research, which makes it possible to establish demands which lead today's level of the development of technology. The values of the parameters and indicators should be the most advanced ones, which guarantee efficiency, reliability, a high technical level, and consumer qualities. The ultimate goal of the formulation and introduction of such standards is the output of competitive domestic products of the highest world level.

The formulation of standards with long-range demands has been started. The main and base organizations for standardization in practically all the sectors of industry have begun this work. The national economic plans envisage in the immediate future the formulation of more than 200 advanced standards for groups of the most important similar products. It is important that this work would be carried out exactly on time and at a high scientific and technical level.

The Programs of Comprehensive Standardization

The implementation of the joint decision of the USSR State Committee for Science and Technology and the USSR State Committee for Standards on the inclusion among the all-union scientific and technical programs (ONTP's) as standard technical support of programs of the comprehensive standardization of the most important types of products, which are formulated by ministries and are approved by the USSR State Committee for Standards, is a fundamentally important measure.

Such standard technical support is envisaged, for example, for the all-union scientific and technical programs on the development and assimilation in production of highly productive metalworking and forge and press equipment for the obtaining of blanks and items by low-waste technology, automatic complexes of highly productive equipment for founding ("precision casting"). The increase of the technical level, quality, competitive ability, and rapid development of the production of such equipment and the increase of its reliability and durability are envisaged in the programs of comprehensive standardization.

During the 12th Five-Year Plan the goal program method should become the main one in determining the prospects of the development of the most important

groups of similar products. Dispensing with the long-range demands, which have been incorporated in the standards of the new type, it is necessary to prepare in advance standard technical documents for raw materials, materials, components, equipment, and technological processes for the output of high-quality products. Here it is important that the programs of comprehensive standardization first of all would "work" in the main, priority directions of technical progress.

The Priority Directions of Technical Progress

Standardization in the area of the priority directions of the development of new equipment is acquiring at present the greatest importance for the acceleration of scientific and technical progress.

The requirements of the intensification of social production, the shortening of the time of the development of new items, and the increase of their quality are placing in the forefront the complete automation of the labor of the designer and process engineer by the development and placement into operation of computer-aided design systems (SAPR's).

Work on the development of computer-aided design systems has now been launched on a broad front in practically all the sectors of machine building and instrument making. However, the mass introduction of computer-aided design systems is being checked by the too high costs of their development.

The extensive use of standardization is a practicable way out of this situation. As calculations show, the use of standard methods and standardized designs makes it possible to decrease significantly the costs of the development of computer-aided design systems.

In May of this year the USSR State Committee for Standards approved "The Program of the Formulation of State Standards and Guidance Documents for Computer-Aided Design Systems (SAPR's) for 1986-1990." The implementation of the program will make it possible to shorten significantly the time of the development of computer-aided design systems, to increase their quality, and to provide the conditions for the introduction of computer-aided design systems at all medium-sized and small planning and design organizations and enterprises of industry.

The automation of production was specified as one of the most important directions of the intensification of the development of the national economy by the decisions of the 26th CPSU Congress and the subsequent CPSU Central Committee Plenums, and especially the April (1985) CPSU Central Committee Plenum. A task was set for industry: to ensure the increase of the output of systems of machines for the complete mechanization and automation of production, to develop automated shops and plants on the basis of the extensive use of industrial robots, highly productive equipment, and built-in automated control systems with the use of microprocessors, minicomputers, and microcomputers.

Here, as was noted in the report of General Secretary of the CPSU Central Committee M.S. Gorbachev at the April CPSU Central Committee Plenum, it is a

question not of the improvement of operating technologies and the partial modernization of machines and equipment, but of the transition to fundamentally new technological systems and to equipment of new generations, which provides the greatest efficiency.

The main attention should be directed to the development and introduction of flexible machine systems (GPS's), which should ensure high labor productivity, the rapid changeover of production, and the significant speeding up of the period of the assimilation of new items by the complete mechanization of all the links of the production process. All this should lead to the development of what is called "unmanned technology."

The effective development and introduction of flexible machine systems are impossible without large-scale operations on standardization.

At present with the participation of representatives of industry the All-Union Scientific Research Institute of the Normalization of Machine Building has formulated a program of comprehensive standardization in the area of the development of flexible machine systems for the 12th Five-Year Plan. The program has been approved by the USSR State Committee for Standards. Its main goal is the preparation of a unified standard technical basis, which ensures a high technical level, the modular block construction of flexible machine systems, and the specialization of the production and copying of their components.

According to estimates, the implementation of the program will make it possible by the end of the 12th Five-Year Plan to increase the output of equipment and labor productivity, to boost the machine shift coefficient, to decrease the cost of the output being produced, to save significant amounts of capital investments, and to free many tens of thousands of workers.

At present work has been launched extensively on the implementation of the program of the comprehensive standardization and unification of industrial robots, which is closely linked with the corresponding all-union scientific and technical program.

More than 20 state standards for means of industrial robotics have already been approved. The fulfillment of the entire program will make it possible to streamline the system of the development and creation of industrial robots, to limit the range of new models, to ensure the interchangeability of their individual integral parts and components, to create the basis of the specialization of machine building ministries in the development and production of means of robotics, their components, and robotized technological complexes (RTK's), the standardization of means of robotics on the basis of the standardization of their components and the unitized modular principle of construction, and to develop modular systems of the control of industrial robots with the extensive use of microprocessor equipment.

At the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress it was emphasized that microelectronics, computer technology, and instrument making--the entire information science industry--are a catalyst of progress.

The tasks on the formulation and, what is the main thing, the fulfillment during the 12th Five-Year Plan of the comprehensive programs of standardization of machines and instruments for the determination of the characteristics of the mechanical properties of materials, means of electrothermometry, pressure-measuring equipment, and systems of the program control of metal-cutting machine tools and industrial robots face the ministries, first of all the Ministry of Instrument Making, Automation Equipment, and Control Systems.

The work on the standardization of personal computers for the solution of scientific, engineering, statistical accounting, and economic problems and peripheral equipment for the Unified System of Computers with the use of microprocessor equipment should also be completed during the 12th Five-Year Plan.

The Food and Energy Programs

The areas of technical progress, which are connected with the implementation of the Food and Energy Programs of the country, are one of the most important spheres of influence of standardization.

The great demands, which are being established in the standards and specifications for agricultural products, should dictate the demands on machines and fertilizers and on the equipment of processing enterprises. The task of changing over from the standardization of the demands on individual agricultural machines to the standardization of the demands on systems and sets of machines and on production lines is arising. It is necessary to include in the standards scientifically sound advanced indicators of reliability, productivity, the power-output and materials-output ratios and to regulate the standard forms and conditions of the operation of machines and complexes under different soil and climatic zones of the country.

The demands on equipment for the storage and processing of agricultural products should be regulated more strictly.

A large amount of work on standardization is already being performed during the implementation of the fuel and energy program. "The Program of the Standard Technical and Metrological Support of the Increase of the Efficiency of the Use of Fuel and Energy Resources for 1981-1990" has been formulated and is being implemented.

The implementation of the program should ensure the establishment in the standards for power-generating, fuel- and power-consuming equipment of advanced indicators and standards of the specific consumption of fuel and power, special standards of power consumption, as well as norms of the accuracy of the measurement of fuel and power consumption.

The standard technical and metrological support of the planning, accounting, and monitoring of the losses of fuel and power at the stages of production, transportation, and consumption should be created upon completion of the program.

Intersectorial Systems of Standards

The general technical and intersectorial systems of standards, which specify the current norms and regulations of the development, assimilation, and use of new equipment, are of great importance in the acceleration of scientific and technical progress in the national economy.

Systems and sets of standards, which specify the regulations and norms in such most important areas of national economic activity as state standardization, the development and delivery of products to production, the technological preparation of production, and the keeping of design, technological, administrative, and other types of documents, have been formed and are functioning in the national economy.

Today the efficiency of these systems as a means of the increase of the technical level and quality of products, the increase of labor productivity, and the saving of manpower and material resources is confirmed by the experience of their long-term use in the practice of the work of all the sectors of industry.

Thus, the improvement of the technological preparation of production on the basis of the standards of the Unified System of the Technological Preparation of Production in all the sectors of machine building, the electrical equipment and radio engineering industry, and others showed that the use of the norms and regulations of the Unified System of the Technological Preparation of Production makes it possible to shorten to two-fifths to two-thirds the time of the assimilation of new equipment, to improve product quality, to increase labor productivity by 15-35 percent, to free significant manpower resources from the sphere of auxiliary production, to facilitate the conditions for the automation of engineering labor, and to create the prerequisites for the changeover to the complete automation of production.

During the 10th and 11th Five-Year Plans the main directions of technological standardization in the system of standards of the Unified System of the Technological Preparation of Production were:

--the standardization of highly productive unitized equipment and readjustable machine tool attachments;

--the standardization of modern technological methods which ensure the multiple improvement of the most important technical and economic indicators of production (the increase of labor productivity, the saving of energy and material resources, and so on);

--the improvement of the forms of the organization of production on the basis of the extensive use of standard technological processes, the batch machining of parts, and standard means of technological equipment.

In the immediate future the standardization of the technological preparation of production under the conditions of the extensive development of flexible machine systems, robotized technological complexes and other advanced types of

technological equipment, systems of computer-aided design and the control of technological processes, as well as modern software and programs will become the general direction.

The USSR State Committee for Standards is attaching great importance to the work, which is being performed jointly with ministries and departments, on the improvement and simplification of the procedure of drawing up and getting agreement on design and technological documents when developing and delivering to production new types of items.

In accordance with the results of the work of the temporary scientific and technical commission, which was formed in accordance with the decree of the USSR State Committee for Science and Technology of 12 August 1983, the USSR State Committee for Standards and the USSR State Committee for Science and Technology in June 1984 adopted the joint decree "On the Further Improvement and Simplification of the Procedure of Drawing Up and Getting Agreement on Technical Specifications When Developing and Delivering to Production New Types of Items." In conformity with this decree changes were made in a number of standards, several standards were repealed.

The result of the work being performed should be:

--the elimination of the excessive regulation of questions which are connected with the organization of creative processes in the sphere of the development of new equipment;

--the simplification and the decrease of the collections of standard technical specifications in this area with the simultaneous increase of their scientific and technical level;

--the transfer of a number of provisions from the standards to the guidance documents on standardization or to procedural recommendations.

Here the organizational methods standards in the area of the development and use of a product should, as before, specify high demands on the general procedure and methods of the performance of work at the most important stages of the development and assimilation of the product, which determine its technical level and quality. This is, first of all, in case of the specification of the assignment and the acceptance of the results of its fulfillment, in order not to paralyze the initiative of developers at the intermediate stages.

Very much here will depend on the ministries: all the made decisions and changes should be reported promptly to the performers. The sectorial documents should not detail excessively and complicate the requirements of the state standards, which, unfortunately, is still being encountered in practice.

The work on the improvement of the procedure of the development and delivery af items to production should yield a quick and appreciable return.

However, it should be kept in mind that the greatest economic impact in the area of the shortening of the time of the development of new items can be

achieved only by means of the extensive use of computers in the process of designing.

In this connection at present a list of themes on the development of the set of guidance documents of the Unified System of the Technological Preparation of Production under the conditions of the operation of computer-aided design systems, which has been included in the draft of the program "The Development and Improvement of the Unified System of the Technological Preparation of Production in Machine Building and Instrument Making, Including the Unified System of Design Documentation, the Unified System of Technological Documentation, and the System of the Automation of Production Processes for 1986-1990," has been drawn up.

The implementation of this program together with the process of computer-aided designing will make it possible to shorten by several fold the time of the drawing up of design and technological documents and the delivery of an item to production.

Metrological Support

The assurance of the unity of measurements and the metrological support of science and production are a most important question of scientific and technical progress.

In the past 60 years a modern technical base of metrology has been established in the country. The USSR standard base, which is the largest in the world, is the highest unit of all measuring work. It includes 140 state standards, which reproduce more than 70 units of physical quantities over wide ranges.

The state standards create the basis of the assurance of the unity of measurements in practically all the sectors of the national economy and, first of all, in such most important ones as machine building, machine tool building, shipbuilding, electric power and thermal power engineering, electronics, transportation, health care, and others.

The USSR state standards in their technical and metrological characteristics are not inferior to the best foreign ones, and in many instances are superior to them.

In this area the increase of the precision of the standards and, following them, all means of measurements on the basis of the more extensive use of physical constants and the knowledge of stable processes of the microcosm is the most important direction of the work for the future. The achievements of spectroscopy and cryogenics are making it possible to expect that in the 1990's "natural" gauges of physical quantities will be used not only at the standard level, but also simply in calibrating instruments.

The first experience of the development and use of flexible machine systems showed that their efficiency is governed by the reliability and quality, first of all, of the transducers, which it is possible to check only at the site under the conditions of an automatic mode of operation. The complication of measuring equipment and the appearance of multifunctional systems often make

simply impossible their transportation to check laboratories, while the automated mode of their operation in practice rules out manual procedures of checking.

The automation of measurements and checking and the extensive introduction of portable gauges of comparison, which ensure the checking of means of measurements at the sites of their operation, are the main direction of the development of metrological support.

Thus, technical progress is dictating new demands on the methods and means of metrological support.

In the next few years it is necessary to develop portable, program-controlled gauges of physical quantities, to develop automated workplaces of the checker on the basis of a standardized family of computer measuring systems, and to change over from "paper" methods to software of measuring and checking procedures.

The Certification and the System of State Tests of Products

The great importance of certification in the mechanism of the management of the national economy as the basis of the evaluation, planning, and economic stimulation of the increase of product quality was specified by the decree of the party and government "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy."

At the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress M.S. Gorbachev named product quality as "the most objective and generalizing indicator of scientific and technical progress, the level of the organization of production, the standards and discipline of labor."

The new Procedure of the Certification of Industrial Products According to Two Quality Categories, which is aimed at making the demands on the product being certified more strict and at increasing the reliability and objectivity of its evaluation, was put into effect as of 1 July 1984.

Definite positive changes have been noted in the performance of the work on certification.

However, as practical experience shows, shortcomings still exist in this work, and the main one of them consists in the fact that the unconditional observance of the established requirements of certification is not being ensured in all cases, at times the highest quality category is conferred on a product without sufficient grounds. For the present the mechanism of removing uncertified products from production is still operating poorly.

One of the basic directions of the activity in the area of certification for the immediate future is the tightening up of the monitoring of the correctness of the conducting of the certification and the output of the certified product. Several forms of this work have now already come clearly into view. For example, all the materials of the certification for a product, which is of

the greatest national economic importance, undergo appraisal at the scientific research institute of the USSR State Committee for Standards, while its results are examined at meetings of the scientific and technical commissions of the committee.

The completion in 1985 of the recertification of products in accordance with the new procedure, the further improvement of the work of state certification commissions, and the attraction of skilled and responsible specialists as members of them are the tasks of the ministries.

At the same time the institutes of the committee and especially its territorial organs must not forget that "a special role...," as M.S. Gorbachev emphasized at the conference on technical progress, "belongs to the USSR State Committee for Standards. Its immediate duty is to erect a reliable barrier against the output of low-quality products."

The system of state tests of the most important types of products for production engineering, cultural, and personal purposes is of the greatest importance for the objective evaluation of the technical level and quality of a product in case of its delivery to production and series output, certification in accordance with the quality categories, the carrying out of state inspection of standards and means of measurement, and the organization of work on the certification of exported products and products which are promising for export.

At present 176 main organizations, which encompass by state tests more than 6,000 types of products, have been approved by joint orders of 36 ministries and the USSR State Committee for Standards. It is necessary to add to this about 800 base testing subdivisions and support centers of the main organizations on the territory of the Soviet Union. The process of establishing new main organizations and forming and developing the operations of operating main organizations is being continued.

At the same time the elimination of the shortcomings in the organization of the work on state tests, which is substantially hindering their development and is decreasing the effectiveness of the activity of the main organizations, is assuming particular importance. These are first of all the need for the supply of testing organizations, as well as the corresponding subdivisions at enterprises with advanced testing equipment and means of measurements and their manning with skilled personnel.

The Means, Forms, and Methods of Strengthening State Inspection

In the set of measures on the acceleration of technical progress the rapid introduction and irreproachable observance of the requirements of standards are of substantial importance.

In recent years for the purpose of tightening up technological and production discipline in the country measures of legal and economic influence on enterprises and organizations, which violate the requirements of the standards, specifications, and metrological regulations when developing,

producing, selling, and circulating products, have been strengthened significantly.

The organs and officials, which carry out state inspection, have been given by the new legislation extensive powers in the issuing of warnings, the stopping and elimination of violations of socialist legality in the area of standardization, metrology, and product quality and, thereby, should have a direct influence on the solution of the most important problems of the development of technical progress.

All the stages of the life cycle of a product from designing to storage and use are now covered by state inspection.

The USSR State Committee for Standards is focusing more and more attention on the inspection of products, which are of the greatest national economic importance, and on checks of the largest enterprises, which determine the scientific, technical, and production potential of the country.

Particular attention is being devoted to the monitoring of the observance of the demands on the quality of products which have been awarded the State Emblem of Quality.

The results of product tests both at the base of the main organizations for state tests and at the testing bases of territorial organs of the USSR State Committee for Standards are being used more and more extensively in the practice of state inspection.

An experiment on the acceptance of products by representatives of the USSR State Committee for Standards and the users is being successfully conducted.

The importance of the activity of the organs of state inspection is now especially great. Precisely they should become a reliable barrier in the way of low-quality products, which have been produced with a violation of the standards and technical specifications, getting to the consumer.

International Cooperation Is a Mighty Catalyst of Scientific and Technical Progress

International standardization, first of all within CEMA, is forming an effective basis of the international division of labor and the mutually advantageous exchange of advanced scientific and technical achievements.

The importance and effectiveness of international standardization in the development and intensification of socialist economic integration determine the extensive scale of the performance of work in this area. In the past decade CEMA organs have developed and adopted about 5,000 CEMA standards, which in practice encompass all areas of the economic, scientific, and technical cooperation of the CEMA member countries.

CEMA standards are being introduced extensively in the national economy of our country. Of the total number of adopted CEMA standards 505 are being used

directly in the USSR national economy, while indicators of 3,085 have been included in the state standards of our country.

The Economic Summit Conference of the CEMA Member Countries, which was held in June 1984 in Moscow, gave new impetus to the intensification of the integration process in socialist cooperation and to the coordination of the economic policy of the fraternal countries.

At the 40th meeting of the session of the Council for Mutual Economic Assistance (June 1985) a general agreement on multilateral cooperation in the development and organization of the specialized and cooperative production of flexible machine systems for machine building and their extensive introduction in the national economy was signed by way of the implementation of specific instructions of this conference. The development of highly automated systems of equipment for various types of technological processes, unitized modular industrial robots, automated control systems and computer-aided design systems, including their software and standard hardware, is envisaged. The session posed for the organs of the council the task of the further development of the specialization and cooperation of production, especially of modern machines and equipment of high quality and at the world technical level.

All this requires the further development of the work on standardization within CEMA and the increase of the level and quality of the drawing up of standard technical documents.

Participation in the work of international organizations for standardization is creating an effective basis for the harmonization of national standards and thereby favorable conditions for the development of international trade.

The USSR State Committee for Standards is actively participating in the work of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

With each year the scale of the work, which is being performed by the ISO and the IEC, is increasing, which is governed by the advantages which joint participation in the formulation of international standards gives the countries.

The increase of the scientific and technical level of domestic standard technical specifications for the assurance of the competitive ability of our industrial products on the world market should be the basic goal of the participation of the USSR in the work of international organizations for standardization.

At present in the Soviet Union 94 ministries and departments and more than 500 main and base organizations for standardization are participating in the work along the lines of the ISO and the IEC. The participation of Soviet specialists in the work of the ISO and the IEC is contributing to the protection of the interests of the USSR national economy when formulating international standards and to the obtaining of valuable information on advanced foreign scientific and technical know-how.

On Plans and Forecasts

The drafting of the state plan of operations on standardization for 1986 is now being completed. Intense work on the plans of USSR economic and social development for 1986-1990 and for the period to 2000, as well as the comprehensive program of scientific and technical progress to 2010 is now under way in all the sectors of industry and in the infrastructure and science. The section "The Development of Standardization and Metrology in the USSR," in which new directions of the development of standardization are being incorporated, is a structural component of these plans. First of all, these are the extension and broadening of the sphere of influence of standardization on the solution of key problems of the economic and social development of the national economy of the country.

The use of standardization for the all-round improvement of the management of the national economy, the intensification of social production and the increase of its efficiency, the acceleration of scientific and technical progress, for the implementation of national economic comprehensive goal programs, the improvement of product quality, and the efficient and economical use of resources should be ensured during the period being planned.

Today an important task faces the USSR State Committee for Standards, ministries and departments, and the main and base organizations for standardization--to put to use all the means for the acceleration of technical progress, the increase of production efficiency, and the improvement of product quality. It is necessary first of all to take steps on:

--the further development, qualitative updating, and streamlining of the prevailing collection of standards, the concentration of efforts and assets on the formulation and introduction of state standards with long-range demands for groups of similar products;

--the carrying out in the immediate future of the efficient streamlining and simplification of the prevailing organizational methods standards in the area of the development and use of products, the focusing of attention in them exclusively on the key questions of the development, assimilation, and use in the national economy of products which conform in their technical and economic indicators to the highest world level.

In the immediate future the streamlining of the collections of sectorial and republic standards, which were formulated on the basis of intersectorial organizational methods and general technical systems, should be prepared and carried out jointly with the sectors of industry.

Much responsible work lies ahead. None of the directions of activity, which have been examined here, should be ignored. The rich 60 years of experience

of Soviet standardization, which has been multiplied by the knowledge, ability, and enthusiasm of the army of many millions of standardizers, should become a guarantee of the successful accomplishment of the tasks facing us.

7807
CSO: 1814/49

BUDGET AND FINANCE

DECREE ON WAGES OF SCIENTISTS, DESIGNERS, ENGINEERS REVIEWED

Moscow SOTSIALISTICHESKIY TRUD in Russian No 9, Sep 85 pp 14-22

[Article by candidate of economic sciences N. Yakovchuk, deputy chief of a department of the USSR State Committee for Labor and Social Problems: "Improve the Remuneration of the Labor of Scientists, Designers, and Process Engineers"]

[Text] The effective use of the manpower potential is a most important component of the efficiency of social reproduction as a whole. Under present conditions, when the party has posed the task to achieve in a short historical time the most advanced levels of productive labor, it is necessary to increase in every way the output of the most skilled portion of the manpower resources--our scientific and technical intelligentsia: scientists, engineers, designers, process engineers.

Many factors influence the effectiveness of their labor: the precise choice of the directions of scientific research, the technical equipment and organization of the labor of researchers and developers, which govern the pace of the performance of work, the quality of the found scientific and technical solutions, the speed of the covering of the path from the idea to its industrial implementation, and so on. Moral and material stimuli and the increase of the interests of scientists and engineering and technical personnel in the acceleration of scientific and technical progress and in the development and introduction in the national economy of new equipment and technology, which conform in their indicators to the highest world level, hold not the last place on this level.

The established system of salaries of scientists, who have academic degrees, has been in effect in the USSR for about 30 years now. It envisages the differentiation of the salaries of directors of scientific research institutes, their deputies for scientific work, and scientific secretaries subject to two conditions: the category in the remuneration of the labor of workers, to which the institute has been assigned, as well as the holding by the given executive of the academic degree of doctor or candidate of sciences.

The salaries of other management personnel--directors (chiefs) of scientific research institutions (that is, problem laboratories, scientific research sectors of higher educational institutions, state or sectorial agricultural

testing stations), as well as managers of structural subdivisions (divisions, laboratories, sectors, departments) of institutes--were determined subject to three parameters--the category in the remuneration of labor, which has been awarded to the scientific institution, the holding by the given manager of a candidate or doctoral degree, as well as the length of his scientific pedagogical work. The remuneration of labor subject to the length of service is established for each position at three levels: with a length of service of less than 5 years, from 5 to 10 years, more than 10 years.

These three criteria governed the amount of the wage of the largest contingent of workers of scientific institutions--senior and junior scientific associates.

At one time this wage system played the role of a powerful lever which interested the workers of science in the improvement of their skills and in the aspiration to defend candidate and doctoral dissertations. At the same time with the years its negative aspects also began to appear more distinctly.

What are its main drawbacks?

First, after the successful defense of the dissertation a life "annuity," so to speak, in the form of a high wage regardless of the quality and results of his labor was guaranteed the scientist. Second, the wage of the scientist with a degree was mechanically increased with his transfer to the next group in length of service, even if his research activity had not increased, but decreased. Moreover, the scientists without an academic degree (and they, as sociological studies show, at times work no less efficiently than their colleagues who have defended a dissertation) did not have such a benefit. Third, in contrast to the procedure which is generally accepted in the national economy, all the salaries of scientists with a degree were established in a fixed amount, without any "spread" which makes it possible to differentiate them for different workers with allowance made for the quality of their labor. Therefore, throughout its existence the system of the remuneration of the labor of people having an academic degree was repeatedly criticized from the rostra of meetings and conferences, on the pages of the press, as well as in the letters of workers to directive organs.

The demoralizing role of this system of the remuneration of labor in science has appeared especially clearly in recent years, when the need has arisen to change the entire national economy over to the path of intensive development which relies entirely on the latest achievements of scientific and technical thought. The large and steadily increasing investments in science and scientific service are not being accompanied for the present by the adequate increase of efficiency. The fact that planning and material stimulation in the sphere of scientific research and experimental design activity for the present are not aimed at the end national economic result, also played not the last role in this. And whereas it was not possible to make dependent on the quality and results of the use of a completed development the variable portion of the wage of scientists, designers, and process engineers--the bonus award--in recent years, with the spread of the cost accounting system of the planning, financing, and material stimulation of work on the development and

introduction of new equipment, the bulk of the wage--the salary--up to now has in no way depended on the results of the labor of the given worker.

The recently adopted decree of the CPSU Central Committee, the USSR Council of Ministers, and the All-Union Central Council of Trade Unions "On Improving the Remuneration of the Labor of Scientists, Designers, and Process Engineers of Industry" is aimed at the solution of this problem and the increase of the material and moral interest of scientists, designers, and process engineers of industry, the USSR Academy of Sciences, and the academies of sciences of the union republics in the shortening of the time of the development and introduction of highly efficient equipment and technology and in the increase of the quality of the work being performed.

Now not a fixed salary with allowance made for the length of service, but a broad "spread," which makes it possible to differentiate very significantly, with a difference of up to 50-130 rubles, the amounts of the salary of specific workers who hold the same position, has been established for each position.

The possibility of varying over a broad range the individual amounts of the salary of each worker will make it possible to decrease the differences in the wage, which are due to the category of the institute. Now only two categories instead of three have been established for scientific research institutes. Three categories are being maintained only for scientific research institutions which do not have the status of a scientific research institute (laboratories and scientific research sectors of higher educational institutions, agricultural testing stations, and so forth).

Many reproaches have been expressed with regard to the small number of positions of scientific associates. Up to now there have been only two of them--junior and senior scientific associate. Frequently yesterday's graduate of a higher educational institution, having come to a scientific institution, was taken on as a junior scientific associate, but retired with the position of senior scientific associate, having been promoted during the entire period of his labor activity by a single level.

In striving to ensure job promotion and to increase the wage of scientists as their skills increased, the executives of institutes often artificially established small structural subdivisions (divisions, sectors, laboratories) and promoted scientists to administrative posts. As a result at some institutes during the checks tens and even hundreds of tiny sectors with two to three people, or else ones consisting of one chief or head of a sector were discovered!

Now such contrivances will become unnecessary. Three new positions: "scientific associate," "leading scientific associate," and "chief scientific associate" have been introduced in addition to the previously existing positions of "junior scientific associate" and "senior scientific associate."

The salaries of scientists up to the present have been differentiated subject to the academic degree. For example, at an institute of the first category it was possible to establish for the senior scientific associate who is a doctor

of sciences a salary of not less than 350 rubles, a candidate of sciences--not more than 300 rubles, and for a senior scientific associate without an academic degree--155-190 rubles.

In the new salary schedule there is no such differentiation. The salary of a senior scientific associate has been established regardless of an academic degree in the amount of 250-350 rubles. This means that a scientist, who has not defended a dissertation, but has achieved high end results, can now receive a wage even in larger amounts than a candidate or doctor of sciences, whose research results seem more modest. It seems that such an approach is correct for such a type of activity as science.

The question of the degree of labor of a worker of science is very complex. In striving to evaluate fairly the contribution of one researcher or another, it is necessary, first, to divide into parts and to evaluate his individual share in the collective product of research activity, second, to examine not only the obtained result, but also the quality of the very process of labor, third, to evaluate the skills of the worker, his capabilities, diligence, and so forth. No one most ingenious salary schedule is capable, of course, of taking such a diversity of factors into account. But how is one then to implement the socialist principle of pay according to labor as applied to the specific nature of scientific work? The many years of experience of the institutes, which operate following the example of the Scientific Research Institute of Physical Chemistry imeni L.Ya. Karpov, have confirmed that in principle it is possible to link the remuneration of the labor of a scientist with its effectiveness. The periodic certification of scientists should serve as a tool of evaluation.

Up to now at scientific research institutions (with the exception of those which have been converted to the "Karpov" system) only those workers (engineers, designers, process engineers, economists, and others), for whom the competitive procedure of filling positions was not used, were certified. But since all the staff positions of scientists and directors of scientific research divisions and laboratories were filled by competition, the scientific personnel were not liable to certification. Henceforth the competitive procedure of filling scientific positions will remain only for those who are coming to work at the given scientific institution for the first time. All other scientists and engineering and technical personnel, including the directors of scientific research subdivisions, will undergo certification regularly, not less than once every 5 years.

The USSR State Committee for Science and Technology, the USSR Academy of Sciences, the USSR Ministry of Higher and Secondary Specialized Education, and the USSR Ministry of Justice in consultation with the USSR State Committee for Labor and Social Problems and the All-Union Central Council of Trade Unions have been charged to draft a statute on the certification of managers, scientists, engineering and technical personnel, and specialists of scientific research institutions, design, technological, planning, surveying, and other organizations of science, production and scientific production associations, and enterprises.

It is possible to hear at times that in the new decree the role of the academic decree has been decreased and even reduced to naught. Is this so? No, it is not so. The role and prestige of an academic degree, on the contrary, are increasing.

The salaries of directors of scientific research institutes and their affiliates, their deputies for scientific work, scientific secretaries, and managers of structural subdivisions, who are doctors of sciences, have been established in larger amounts than those of candidates of sciences. In those cases, when highly skilled specialists with much experience of practical work, who do not have an academic degree, are appointed to these positions, their salaries can be established for a period of up to 3 years only in the minimum amounts which are stipulated by the new salary schedule for the given position.

The position of leading scientific associate, according to the decree, can be filled by a scientist who has the academic degree of candidate or doctor of sciences, while the position of chief scientific associate can be filled only by a person who has the degree of doctor of sciences.

Thus, the role of the academic degree not only is not being belittled, but is even increasing. Only its mechanical influence on the increase of the wage has been decreased. Thus, after the awarding to scientists of an academic degree the managers of organizations can transfer them to a higher position or increase their salaries by the amount of up to 50 rubles a month within the limits of the maximum salary for the held position, while for designers, process engineers, and other specialists in case of the awarding of an academic degree the increase of salaries is carried out in the amounts stipulated by legislation.

Under present conditions the importance of the labor of designers and process engineers, who are called upon to ensure the quickest implementation of scientific achievements in industrial practice, is increasing drastically. It has long been time to establish appreciable advantages in the remuneration of the labor of designers and process engineers as compared with other categories of engineering personnel at enterprises and institutions.

An increase on the average by 20 percent of the maximum amounts of the salaries of designers and process engineers of scientific research institutions, design and technological organizations, production and scientific production associations and enterprises of industry, the USSR Academy of Sciences, and the academies of sciences of the union republics, which have been assigned to the first and second groups (categories) in the remuneration of labor, is envisaged by the decree "on Improving the Remuneration of the Labor of Scientists, Designers, and Process Engineers of Industry."

Here the salaries of process engineers of the first, second, and third categories have been increased to the level of the salaries of design engineers of the same category. USSR ministries and departments and the councils of ministers of the union republics are permitted if necessary to

introduce at subordinate design and technological organizations the positions of leading process engineers with salaries at the level of leading designers.

At the same time the possibilities of the increase of the wage of scientists, designers, and process engineers are not limited to the increase of salaries.

The decree of the CPSU Central Committee, the USSR Council of Ministers, and the All-Union Central Council of Trade Unions increased substantially the possibilities of directors of design and technological organizations, scientific research institutions, production and scientific production associations and enterprises of industry, the USSR Academy of Sciences, and the academies of sciences of the union republics to reward the scientists, designers, and process engineers, who make the most significant personal contribution to the cause of technical progress. It is permitted, in particular, to establish for these workers increments for the performance of the most difficult and responsible jobs in the amount of up to 50 percent of the salary, and for other highly skilled engineering and technical personnel, specialists, and employees--up to 30 percent of the salary.

Would it seem that there is something special and new here? Today the directors of scientific research institutions and design and technological organizations also have the right to establish in consultation with the trade union committee for scientists, engineering and technical personnel, and other specialists, who do not have an academic decree, wage increments in the amount of up to 30 percent of the salary, by using for these purposes up to 2 percent of the planned wage fund of the institution and organization. Life has shown that these increments did not have a large stimulating influence on the efficiency of the work of scientific and design organizations. The whole point is that the former increments were established "forever." Extraordinary circumstances, for example, the obvious failure to observe the demands on the quality of the work being performed, were needed to cancel them. In other words, such a permanent increment already 1-2 months after its granting was perceived by the worker as a mechanical "makeweight" to the salary and an integral part of the monthly wage.

The new increment is short-term. It is granted for a specific time which has been announced in advance. This can be the time which has been allotted by the plan for the fulfillment of the given theme or a stage of it, as well as another time which was specified when establishing the increment. If during the period of the fulfillment of the theme it has been found that the set deadline of its completion is not been observed or the quality of the research and development is unsatisfactory, the increment can be reduced or completely canceled. Such a decision is possible in case of the violation by the worker of labor or production discipline.

In order to earn the right to an increment for the next period, it is necessary to prove that you are receiving it today not without reason.

Another important distinction consists in the fact that the director of an organization has the right to spend for temporary increments not 2 percent of the wage fund, but the entire saving of this fund.

The practice of establishing such increments arose for the first time and was developed by way of an experiment over 2 years in the design and technological subdivisions of five production associations of Leningrad, the initiators of the now well-known "Leningrad experiment." These are the Izhorskiy zavod Production Association imeni A.A. Zhdanov, the Leningradskiy metallicheskiy zavod Production Association, the Nevskiy zavod Production Association imeni V.I. Lenin, the Elektrosila Production Association imeni S.M. Kirov, and the Leningradskiy elektromekhanicheskiy zavod Production Association.

As a result of the increase of the efficiency of the labor of designers and process engineers and the decrease of their number by more than 9 percent as compared with the list of staff during the first 1.5 years of the experiment the subdivisions and services, which are participating in the experiment, for the 5 associations saved more than 2.8 million rubles. A significant portion of this saving (about 2 million rubles) was allocated for the establishment of increments.

At each association its own procedure of granting and canceling the increments was established. But in general, the Leningraders believe, the increments which are established for a period of 1-3 months, that is, for the time of the eulfillment of a specific assignment, have the most stimulating effect. The average amount of the increments is 30-35 rubles a month, while the maximum comes at the Izhorskiy zavod Association to 170 rubles, the Leningradskiy metallicheskiy zavod Association--185 rubles, and the Elektrosila Association--195 rubles a month. On the average in a month at these associations more than 40 percent of the designers and process engineers receive increments.

The use of short-term increments to the salaries of designers and process engineers along with other economic stimuli contributed to the rapid fulfillment of research and development, the increase of their quality, and the decrease of the number of deviations in the technological processes due to errors of the process engineers.

The additional material stimuli, which are envisaged by the decree, enable the managers of enterprises and organizations to link the amount of the wage of each worker more closely with the quality and results of his labor. On the other hand, the new decree gives every scientist, designer, and process engineer the opportunity to increase substantially the amount of his wage. And not only due to the fact that the amount of the salaries guaranteed by the state has increased. The possibilities of its further increase are connected precisely with the quality of the individual labor of the researcher and developer, with the results of his labor efforts. And there are several of these possibilities. First, the long-term increment for skills (up to 30 percent of the salary). Second, temporary increments, which were discussed above (up to 50 percent of the salary). Third, the bonus, the amount of which depends on the economic efficiency of the introduced development.

Until recently the third of the indicated factors had an appreciable influence on the level of the wage primarily of those researchers, designers, and process engineers, who work in the sectors of industry or take a direct part in the development, creation, and introduction of new equipment. Now such

possibilities are also being broadened for scientists and engineers who are employed at institutes of the USSR Academy of Sciences and the academies of sciences of the union republics.

In the report at the festive meeting, which was devoted to the 40th anniversary of the Victory of the Soviet People in the Great Patriotic War, Comrade M.S. Gorbachev, in characterizing Soviet society as a society of a highly developed economy, noted the profound changes in the structure and scientific and technical level of production. "Such new sectors of industry," he said, "as the atomic, space rocketry, electronics, and microbiological sectors, have been established." The outstanding achievements and successes of these sectors of industry became possible on the basis of the increase of basic knowledge and profound theoretical developments in the field of nuclear physics, solid-state physics, and molecular biology. These and other developments, which are capable of becoming the base for the development of fundamentally new industrial technologies, are being carried out for their significant part at institutes of the academic type.

It seems very farsighted that the stimulating steps, which are envisaged in the decree and are oriented first of all toward applied scientific and technical developments on the creation of new equipment and technology in industry, are also extended to the institutes of the USSR Academy of Sciences and the academies of sciences of the union republics, which are conducting theoretical and basic research.

Moreover, several preferences in the formation of incentive funds have been given to academic institutes. The group of sources, by means of which the material incentive fund is formed, has been enlarged for these institutes. It is permitted to establish a fund for sociocultural measures and housing construction. In particular, a twice as large (with respect to the wage fund) amount of assets, which are envisaged for the payment of bonuses to workers in the estimates of scientific research institutions and design and technological organizations, than at present will be channeled into the material incentive fund.

The USSR Academy of Sciences and the academies of sciences of the union republics for the purpose of the performance of the set amount of work with a smaller number have been granted the right to allow subordinate scientific research institutions and design and technological organizations to allocate for incentives the saving of the wage fund, which is formed as a result of the decrease of the number of workers. Due to these assets the amount of the incentives can come to 5 percent of the annual wage fund of the institution and organization.

There will also be included in the material incentive funds of academic institutes the assets which are transferred to them by production and scientific production associations, enterprises, and organizations from their material incentive funds in case of the joint development and introduction of equipment and technology, which conform in their indicators to the highest world level.

And, finally, there is another source of payments to the material incentive funds of academic institutions--the assets which are envisaged in the economic contracts with production and scientific production associations and enterprises subject to the economic impact of the development being performed.

The absolute amounts of the assets, which it will be possible to spend for the payment of bonuses at these institutes, will increase by several fold.

Thus, it is now possible to organize a three-in-one system of incentives of scientists of academic institutes: first, to stimulate the conducting of basic research; second, to interest researchers in the quickest use of scientific results in national economic practice; third, to ensure the connection of the amounts of the award with the efficiency of applied developments.

The USSR State Committee for Labor and Social Problems, the USSR State Committee for Science and Technology, the USSR State Planning Committee, the USSR Ministry of Finance, and a number of other ministries and departments have been charged jointly with the All-Union Central Council of Trade Unions to draft the enforceable enactments which are necessary for the implementation of the decree. The Statute on the Formation and Use of Economic Stimulation Funds at Scientific Research Institutions and Design and Technological Organizations is one such document.

Measures on the improvement of the organization of the wage of scientists, designers, and process engineers of scientific research institutions, design and technological organizations, production and scientific production associations and enterprises of industry, as well as scientists, designers, and process engineers of institutions and organizations of the USSR Academy of Sciences and the academies of sciences of the union republics will be implemented starting in 1986. The USSR ministries and departments, the councils of ministers of the union republics, the USSR Academy of Sciences, and the directors of associations, enterprises, organizations, and institutions will establish the specific dates, as well as the procedure and sequence of the introduction of the new conditions of the remuneration of labor in consultation with the corresponding trade union organs.

The measures envisaged in the decree afford extensive opportunities to the directors of institutions and organizations, associations and enterprises to increase the output of scientific, design, and technological organizations, subdivisions, and services and to expedite the development, creation, and assimilation of modern technical and technological innovations. The success of the matter will depend on in how well thought-out and systematic a manner these rights are exercised.

Some time ago the USSR State Committee for Labor and Social Problems conducted a survey of a number of scientific, design, and planning and technological organizations. Its results merit their recalling today.

From the rostrum of the All-Union Conference on the Increase of the Quality and Technical Level of Machine Building Products and the Saving of Metal (1981) the managers of a number of design and technological organizations

voiced critical remarks about the conditions of the remuneration of the labor of the workers of these organizations. The impossibility of singling out with respect to the remuneration of labor the most actively and creatively working developers of new equipment and technology was noted as the main drawback. The USSR State Committee for Labor and Social Problems at that time sent brigades to 15 institutions and organizations of machine building ministries for the purpose of studying in detail how the prevailing norms on the remuneration of the labor of designers and process engineers were being used at them. For already at that time, in addition to the differentiation of the salaries according to three categories subject to the difficulty of the work being performed, the managers of the organizations were permitted to establish for highly skilled designers and process engineers wage increments in the amount of up to 30 percent of the salary, which were discussed above.

For designers working at industrial enterprises the amount of the increments in 1979 was increased to 50 percent of the salary.

What did the survey show?

At the majority of checked organizations (the Central Design Bureau of Forge and Press Machines of the Scientific Production Association of Forge and Press Machine Building, the VPTIelektro, in the design section of the All-Union Scientific Research Institute of Machine Building for Animal Husbandry and Fodder Production, and many others) the salaries of all the chief project designers--this most skilled (and accordingly most highly paid) part of the design personnel--were established at a lower level than the average wages envisaged by the schedule. As for the increments--and this is a very good opportunity to differentiate the remuneration of labor and to single out the most talented, creative workers--this opportunity was used by the managers of the organizations primarily as means for pulling up the wage of the low-paid categories of workers. Instead of singling out the best people, they distributed the increments in an equalizing manner according to the principle "a little to everyone." Their amount did not usually exceed 10-15 rubles. What kind of stimulating effect is there here, if an increment in an amount close to 30 percent of the wage was not established for any of the designers and process engineers of the checked organizations? Moreover, increments were not established at all for any chief project designer at the checked organizations!

It is most surprising of all that the same directors of scientific research, design, and technological institutes and organizations, who from the rostrum of the all-union conference spoke about the shortage of rights, also did not exercise completely the rights which they had. While advocating greater differentiation in the remuneration of the labor of researchers, designers, and process engineers, in practice they leveled as much as possible the differences in their wage, striving "not to offend anyone." It is no great secret that such a tendency is also appearing today at many institutes and design organizations.

The breaking with customary leveling in the remuneration of the labor of workers requires a certain psychological reform in collectives and even, perhaps, the courage of managers.

The stimulating effect of the measures envisaged by the decree will be stronger, the more efficiently it will be possible to organize the labor of researchers, designers, and process engineers, the more reliably it will be possible to take into account the contribution of each developer to the collective result, and the more objectively and thoroughly it will be possible to evaluate this contribution.

The new conditions of the remuneration of labor will be introduced by means of gnd within the limits of the planned wage funds of the corresponding institutions and organizations, and at associations and enterprises of industry--within the limits of the wage funds of managers, engineering and technical personnel, and employees. Such conditions dictate to USSR ministries and departments and the councils of ministers of the union republics the need to raise to a qualitatively new level the practice of determining the planned expenditures of the wage on the conducting of some research and ractice of
determining the planned expenditures of the wage on the conducting of some research and perform much work on the
improvement of the organization and the increase of the efficiency of the labor of researchers and developers, on the improvement of the structure of management, on the elimination of unnecessary subdivisions, and on the freeing of the surplus number of workers.

For the more accurate evaluation of the personal contribution of each worker to the cause of technical progress the same institutes, for which the new conditions of remuneration are being introduced starting in 1986, need to engage immediately in the formulation of standards of the labor-output ratio of the basic types of operations being performed at the organization, as well as to think over the method of the issuing and acceptance of individual assignments and the recording of their fulfillment and the criteria of evaluation.

The experience of the trailblazers of the "Leningrad experiment" and their followers--the Scientific Research Institute of Heavy Machine Building of the Uralmash Production Association, as well as the group of production associations of the Ministry of Tractor and Agricultural Machine Building--has clearly shown that this preliminary stage is most difficult and important for the future success of the matter. The results of the use of the new principles of the remuneration of labor depend precisely on in how high-quality and purposeful a manner the preliminary work--organizational, standard methods, explanatory--was performed in one collective or another.

The workers of ministries, departments, scientific institutions, and design and technological organizations need to study and adopt the know-how of the organization and remuneration of labor, which has already been assimilated and developed in the leading collectives. The use of collective forms of the labor of designers with remuneration in accordance with the end result on the basis of the principles of the brigade contract, for example, is yielding very good results. They have been successfully using such a form for 4 years at the Ulyanovsk Main Special Design Bureau of Heavy-Duty Machine Tools and Milling Machines.

The number of workers in the brigades is determined on the basis of the planned labor intensiveness of the operations on the project being performed (or the stage of it, which has been assigned to the brigade) and the prevailing norms of labor expenditures. A job authorization, in which the planned date of completion, the average number of performers, the labor intensiveness of the operations in accordance with the standards, and the basic wage according to the estimate are indicated, is issued to the brigade for each project (or stage of it). The labor is evaluated and paid for in accordance with the end result--the project delivered to the client. The monthly wage is credited to each member of the brigade as an advance with allowance made for the coefficient of labor participation. After the completion of the job the remaining assets are distributed among the participants in the fulfillment of the job authorization on the condition of the conformity of the technical level and economic indicators of the completed development to the requirements which are stipulated in the job authorization-assignment.

All these precious grains of experience will serve as the basis, on which the measures on the improvement of the remuneration of the labor of scientists, designers, and process engineers, which have been outlined by the party and government and lead to the acceleration of scientific and technical progress and the efficient use of the achievements of science and technology in the national economy, will be implemented.

7807
CSO: 1814/56

TRAINING AND EDUCATION

KOMSOMOL YOUTH TRAINING PROGRAMS IN SCIENCE, AUTOMATION

Moscow PRAVDA in Russian 25 Jul 85 p 3

[Article by A. Zhuganov, secretary of the Central Committee, The All-Union Leninist Communist Union of Youth: "The Builders of the Future: To Accelerate Scientific and Technical Progress"]

[Text] Anyone who has recently visited one of the Moscow machine building factories will certainly remember the unusual machine tools in one of the shops. The place normally taken at these machines by workers are now filled by robots. With the precise and calculated movements of their "hands", they grasp blanks, set them into the holder and then take out the finished part.

Many compliments were given the people that created these robots. It was all the more gratifying to hear that their designers were young scientists and specialists, half of whom were no older than 30. For creating the Elektronika NTsTM robot, they received the Lenin Komsomol Award for science and technology.

There is still another factory shop whose changes are most striking. It once employed 420 workers: there now remain 26 and these are the operators of the control panel. There is ideal cleanliness and order. Neither metal chips nor any other sort of waste is seen lying around. The finished parts leave the machine directly for packaging. All of this work is done by stationary and mobile robots. One is reminded of science fiction but this is today's reality.

It is also true that this is a reality of advanced and progressive technology and this is what all of our modern industry should strive to attain. It is the calling and duty of young scientists and specialists to help our industry reach this level.

Still a few words about the Elektronika NTsTM. Just as with any complicated item of microelectronics, the approach taken to the industrial robot has made it superior in performance and reliability to any domestic as well as to many foreign robots. Its simple design and high technological quality have made it possible to set up its mass production in a small amount of time. The robot has been highly praised by buyers and is used as a basic item of equipment in many of the leading machine building ministries. It has been introduced at

over 30 plants in our country. This has made it possible to expand the number of machines that can be operated, increase the number of work shifts and increase the volume of production per square meter of work area by two to three times.

Economic effects are not the only important aspect of robotization. When you see how children's faces light up with interest at complicated scientific and technical problems, you understand what great advantages it offers them. It is scientific and technical creativity that gives them a beautiful sense of self identity and makes them feel that they are builders of the future.

Today, young people under the age of 30 make up nearly half of our country's scientists and engineers. The various Komsomol organizations in our country contain about 121,000 scientific workers, about 2000 doctors and candidates of science and more than 8 million specialists with higher and middle special educations. This is a remarkable force that can make its contribution to increasing the efficiency of Soviet industry.

How do we teach creativity? It seems that this was and will always remain one of the chief problems facing educators. The Komsomol has found and introduced forms of education that correspond to all age groups and categories of youth. To skillfully engage the changing sense of curiosity of early childhood and the living fascination with building things, give the student the possibility to express himself and challenge himself at the threshold of the important work of his life and to assign a young specialist an interesting task are part of a comprehensive program for involving Komsomol members and youth in work to accelerate our scientific and technical progress. Such programs have been developed by many municipal and regional Komsomol organizations. The Komsomol gorkoms in Moscow, Leningrad, Kiev, Minsk, Sverdlovsk and Tomsk have been able to attract youth to the most important scientific and technical work.

The combined creative youth collectives [KTMK] have proven themselves in recent years. They have been created to solve serious scientific and technical problems from organization to embodiment of a designed object. There have already been made many significant contributions to this. Their efficiency is obvious: it has been estimated that with the help of the KTMK, new technology is being assimilated three times as fast.

There now exist more than 15,000 such creative collectives in our country. They have brought together more than 120,000 young scientists, engineers, workers and students. It is significant that their work is sometimes involved with industrial and territorial problems connected with economic or social development of entire regions.

Thus, the specific cause taken up by the Leningrad regional Komsomol organization has become creative participation by youth in the Intensification-90 territorial and branch program. As we know, one of the most essential elements of this program is a sharp reduction of manual labor and increased production of higher quality. The Komsomol obkom, the Finance Snd Economics Institute imeni N.A. Voznesensky and the regional youth paper SMENA have announced a large-scale campaign called "Spurt". This is a sports term that refers to a break or a sharp increase in the rate of movement.

Young innovators from Leningrad read it as meaning: "We will eliminate manual labor from industry".

An offensive against unproductive manual labor has been taken by young innovators at plants, design bureaus and institutes in Belorussia, Latvia, Georgia and the Kuybyshev and Chelyabinsk oblasts and others. The Zaporozhets obkom has just this year decided to increase by 150 percent the number of KTMK involved in the automation of manual labor.

However, the creation of such flexible, dynamic goal-oriented collectives of young enthusiasts also requires a new degree of organization. Sometimes these collectives bring together specialists not only of different plants but also of different cities and ministries. Departmental barriers are often hard to overcome. The boys from the Industrial Association imeni Kozitsky in the city of Leningrad complain that after the first phase of the "Spurt" operation, they planned specific tasks and began to create a KTMK to mechanize the stockpiling and supply of metal to their shop. It was necessary to involve young specialists from 5 different shops and divisions but the list of members of staff in effect prohibited this. They were therefore unable to create their own creative collective.

What if the representative of an KTMK must be sent to work at related factories? What if research must be financed? Work time, materials, equipment, energy -- it takes more than creative endeavor to solve serious scientific and technical problems. Often these resources are denied.

However, enthusiasm alone is not enough. The ministries and departments should applaud young innovators for their breakthroughs and not allow their efforts to dwindle. In essence, not much more is needed. We must measure costs not according to obsolete procedures but according to real feasibility and the economic and educational results.

Student scientific associations also await aid. The successes of many of these construction, design, architectural and economic organizations are very well known. The student bureaus of the Moscow Aviational Institute, Lvov Polytechnical Institute, the Dnepropetrovsk Engineering and Construction Institute and many others are more and more convincingly showing their high degree of scientific expertise. During the last working semester, about 1500 student scientific and production sections did their own scientific research. This has also had its barriers -- with the rare exception of of some student design bureaus, they have no organizational rights. Without these rights, the most original, clever and economic designs never make it off of the Whatmann paper. This of course extinguishes youthful creativity that so much needs the stimulus-result incentive.

Computer literacy of the new generation of specialists is also the order of the day now. The Komsomol directs mass youth training in the fundamentals of computer technology, programming and its introduction to industry. The Central Committee has created a working group that has been ordered to combine all of these problems within a single long-term program.

Computers are also coming into school classrooms. Of great interest is Novosibirsk's experience in which young scientists of the Siberian Chapter of the USSR Academy of Sciences participated very actively with young programmers in sponsored schools, a summer school of mathematics and physics and at the Palace of Pioneers. The young programmers take part in contests conducted by the Institute of Atmospheric Optics and rival the graduates of schools of higher learning.

We can also see some weaknesses that sometimes interfere with computer education. Industry has been unable to keep up with the demand for equipment and there is no material base for the widespread teaching of this "technical alphabet" of modernity. Soviet video technology is still in an embryonic and we cannot even consider shelves of video cassettes or the mass production of electronic games and teaching apparatus. This is due to the inertia of economic planners as well as of departmental lack of interest. The youngest innovators are called upon to overcome these barriers. They must start with active competition organized by the Ministry of Electronic Industries to develop better instructional computers for schools and trade schools.

There are many things that need the application of youthful hands and energy. The party has placed its special hopes on our motherland's young generation. The Komsomol and Soviet youth have everything -- knowledge, curiosity, the enthusiasm of youth and a high feeling of civil responsibility to be at the forward line of scientific and technical progress.

12261
CSO: 1814/272

AUTOMATION AND INFORMATION POLICY

AZSSR COMPUTERIZATION TASKS OUTLINED

Baku BAKINSKIY RABOCHIY in Russian 26 Jul 85 p 3

[Article by Professor M. Bagirov, rector of the Azerbaijan Polytechnical Institute imeni Ch. Ildrym, doctor of technical sciences and Professor T. Askerov, director of the Computer Technology Faculty, doctor of technical sciences: "Schools of Higher Learning: The Engineer and Computers"]

[Text] Greater scientific and technical progress depends to a large extent on how well the leaders of industry master modern means and methods of controlling industry. A very significant role is also played by the level of professional mastery of specialists working in the field of computer technology, automated equipment and the automation of industrial processes. Aside from that, the time has come for all specialists such as machine builders, mechanical engineers, petroleum industry specialists and metallurgists to be able to use computer technology in their work.

Industry's conversion to completely new forms of technology places high demands on the knowledge and education of specialists and therefore on the work of technical schools.

The need for fundamental improvement of the training of highly-qualified specialists was emphasized at a meeting of the Azerbaijan Communist Central Committee which was dedicated to exemplary organization of entrance examinations.

The Azerbaijan Polytechnical Institute imeni Ch. Ildrym in particular faces new and important tasks.

The institute trains engineers to be specialists in computers and the technology of automated production processes in the machine building industry. Each year, about 275 first-year students begin studies specializing in computers. Just last year, the computer science faculty graduated 233 systems engineers.

At the present stage of scientific and technical progress, systems engineers face special requirements and their training is very specific. They should have a good knowledge of an entire range of equipment from microprocessors, micro- and minicomputers and large main-frame computers to the diverse

computer and control systems, complexes and networks formed from them as well as both applied and systems programming. This is especially obvious in the methodological directions on the content of graduate work in the specialization of computer science. These directions have pointed out that in many cases electronic systems require not schematic and technical but program adjustment for the performance of certain functions or modes of work and some computer technology such as microprocessors is increasingly being used in the form of built-in computer devices, microprocessor or multiple computer systems, complexes and computer networks. As a result, the amount of algorithmic, structural, programming and systems-technology problems have increased. Therefore, graduate work oriented at the development of computer software and systems should be put to extensive practical use. All of this has now been reflected in new teaching plans and programs that our institute has worked on for the last three years and for which it has also created a technical base and an improved methodology of teaching. In 1980, as the first in our republic, we created a filial of the computer sciences faculty at the Baku Radio Factory. More than 200 students here have already undergone specialized study here, that is, they have learned about the development of various modern computer equipment and the creation from microprocessors of data processing systems. A large amount of diploma work at this filial has found direct application and many of the graduates remained to work at this factory. These successes have been achieved with the help of its leading specialists.

With our experience, we have created the same type of filial at the Institute of Cybernetics of the Azerbaijan Academy of Sciences. The students use modern computers and participate in the work of the institute's special design bureau. They conduct theoretical and practical work with the institute's scientists and use its base of advanced technology. Graduate from the computer sciences faculty come here to work.

Organizational problems are being solved in order to create still another two filials of the computer science faculty at the Astronautical Research Science and Production Association and the BZBK [not further identified]. They have already concluded agreements on creative cooperation.

Four such filials already presents us with greater possibilities for a more modern and diverse technical base and with the help of highly-qualified specialists from industry. This allows us to enhance the scientific and technical sophistication of young computer engineers and that they can be attracted to work in industry. Older students can be attracted to research work and encouraged to take an active part in introducing new developments and research achievements. It is no secret that as long as we lack a sufficient amount of the computer technology that we need, this form of integration of schools, research institutes and industry can undoubtedly give us very much. To be exact, what can it give us? At the computer sciences faculty, there has been created a branch scientific research laboratory of the Astronautical Research Science and Production Association. This laboratory will deal with essential problems of processing and storage of astronautical data.

At the BZBK last year there was begun scientific research work on the creation of flexible automated centers in various technological centers, for example,

the metallurgical powders section. Our graduates have been involved in this work and have also produced their own graduate work.

Now we must consider the problems that still have to be solved.

The first such problem is how to attract experienced and qualified industrial and academic specialists to work in the faculty's filials. In our opinion, it is necessary to establish and consolidate a full-time staff at the filials and then, as usual, to conduct the hiring of civil servants who are to occupy several posts jointly, by announced competition with a 5-year limit.

It is also thought that industrial directors should be obliged to provide the filials of the computer science faculty and all faculties of higher learning in general with samples of their production, This has also been addressed by a CPSU Central Committee and Council of Minister's decree that was issued just a few years ago. The degree set measures to be taken to further the development of higher and middle education and improve the training and use of specialists. In our opinion, it would be advisable to to work out well-substantiated five-year plans to equip schools with computers of the appropriate type and strictly monitor the implementation of these plans. This would therefore eliminate the disproportion in the supply of computers to different schools.

The resolution of this problem would, on one hand, improve the quality of engineer training in the necessary areas of specialization and raise the level of research work. On the other hand, it would also increase the pace at which the necessary automated control systems are created for schools of higher learning and for the branches of the Azerbaijan SSR's Ministry of Higher Education. This is of special importance to our institute because, aside from training computer specialists, we still have to be able to teach the entire contingent of the institute, both students and teachers, to work with computers. Engineering cadres must be retrained to work with computer technology.

Since last year, we have continuously conducted one-semester courses on programming and microprocessor uses. We are now working on programs to retrain the professors and instructors of all of the different faculties. Instructors are studying theoretical problems and doing practical and course work on a chosen special discipline such as automated production technology.

Successful course work has also been used with students in the given faculty Therefore, for a certain period of time, each special faculty will maintain a data bank of course work that reflects how programming and microprocessors can be used to solve scientific, design and practical tasks within each specialization. Some of the faculties such as those dealing with automated production technology, electronics theory, automation and computer technology have their own microcomputers that they use to teach and conduct research.

The results of teacher training in computer courses will be evaluated when the teachers are certified. A program for accelerated training of all of the institute's professors and teaching staff has already been prepared.

In order to more widely introduce mathematical methods and modern computer equipment to the teaching process, we have planned for the next five-year period to develop and introduce to the institute a local computer network that can be used by all. We are receiving new computers for this purpose and we are planning to obtain a large quantity of terminals. Each faculty will receive its own terminals which will allow them to work with a main-frame computer. There is being developed a common extensive program aimed at improving the training of specialists on the use of computer technology.

We consider it our duty to make our own introduction to this work to computerize education in middle schools. The computer sciences faculty has made an agreement with the republic institute for teacher training. Under this agreement, both institutions will work together to prepare methodological instructions, laboratory work and textbooks for teaching instructors about the fundamentals of data processing and computers.

The program for a course on the fundamentals of data processing and computer technology is being developed and we suggest that this course be introduced to the republic's television broadcasting. The faculty's instructors have already begun to consider the presentation of such a course in the various zones of the republic (Sheki, Geochkay, Lenkoran, Ali-Bayramly, Elvakh) for middle school teachers. This means that in the future, the institute will receive first-year students that have already mastered the basics of data processing and computer science.

12261
CSO: 1814/262

PATENTS AND INVENTIONS

INVENTORS RESORT TO COURTS FOR REWARDS

Moscow PRAVDA in Russian 17 Oct 85 p 3

[Article by candidate of juridical sciences V. Chertkov, lawyer (Moscow): "The Lawsuit on the Reward. Why Are Inventors Turning to the Court?"]

[Text] When Western firms denied the Soviet Union the delivery of large-diameter pipe, our designers found a way out of the situation. Engineers V. Smirnov, A. Shmyrev, and others proposed a fundamentally new technology of the smelting of metal for such pipe. The invention was officially registered, but the question of the reward arose. The case came to court. The trial lasted from 1983 to 1985, perhaps not shorter than it took the invention itself to arise.

The law suit arose due to the fact that at all three metallurgical enterprises, which in one way or another took part in the production of the pipe, a saving was not obtained: the introduction of the new technology required considerable expenditures. However, as a whole the economic impact owing to the giving up of imports, according to the data of the Foreign Trade Bank, came to tens of millions of rubles.

According to the law 2 percent of the saving, but not more than 20,000 rubles, is due to the authors. How is one to distinguish the gain directly from the introduction of inventions? And who specifically should pay?

There was something to think about. Experts, Judge M. Ivanova of Zhdanovskiy Rayon of Moscow, and people's assessors pondered. They argued, and how! The court recovered the reward for the authors from the USSR Ministry of Ferrous Metallurgy, to which all three plants, which assimilated the new technology, are subordinate. The Ministry of Ferrous Metallurgy appealed to the Moscow City Court. And again there were lengthy, exhausting disputes. Nevertheless they upheld the decision of the rayon court. The authors were worthily rewarded.

This is justified, since innovation must be stimulated materially. At the conference in the CPSU Central Committee, which was devoted to the acceleration of scientific and technical progress, the drafting of the Law on Invention, in particular, was discussed. Such a law is necessary. The criteria of the monetary reward cannot but be a fundamental part of it. So

far they have by no means always been indisputable, even when the courts consider them. Meanwhile inventors and innovators should be sure of the protection of their rights in case of a conflict, so that they would not lose heart. The enormous moral importance of the consideration of inventors' cases in the court lies in this.

The suits of the authors against organizations for the recovery of the reward divert them from creative work, exhaust the nerves, and take time. And great effort is required of the court in the process of preparing for the hearing of cases and studying the materials, as a rule, very specific materials. It is impossible to regard every nonpayment of the author's reward and each short changing of an innovator as anything but an extraordinary event which hinders technical progress. And as soon as a dispute has entered the sphere of the court, it should be equal to the present demands on the stimulation of creative technical work.

The Statute on Discoveries, Inventions, and Efficiency Proposals, which was approved by the USSR Council of Ministers, has been in effect for more than 10 years. Instructions and explanations have been adopted and are being elaborated in development of the statute. The patent services at enterprises, design bureaus, and scientific research institutes are being developed and improved. So as a whole the picture of the legal regulation of invention does not evoke reproaches.

Matters with the hearing of disputes of this category, it would seem, are also quite good. The decree of the plenum of the USSR Supreme Court "On the Use by the Courts of the Legislation Which Regulates the Relations Which Arise in Connection With Discoveries, Inventions, and Efficiency Proposals" in its preamble directly orients the courts toward the preferential protection of the rights of innovators. It is recommended by the same decree that inventors' cases would be considered by the oblast and republic courts for the assurance of a higher level of investigation. Under the conditions of Moscow and Leningrad, where there are especially many such cases, the people's judges in each court have been singled out personally.

What are the problems? There are several of them. I will speak about the simplest, perhaps psychological one. The people's judge considered the case of the recovery of 12,000 rubles for the use of an invention. He had great doubts. About what? Incomplete or poor-quality materials? No. But the amount, the amount. I try to explain that this is only two-hundredths of the economic impact obtained by the state. Yes, the judge agrees, but I cannot bring myself to make a decision on the payment of such a large amount of money.

It is a typical situation. The plenum of the USSR Supreme Soviet, apparently, also had it in mind in its preamble. But what happens? The invention has already been used, the impact has been obtained. All this is in the past, at times in the distant past. While the author today is demanding money. Moreover, considerable money. Here a certain psychological barrier also arises for the judge. It is necessary to surmount it. The "caution" in such instances, which is in no way justified, turns into great moral harm. The creative impulse of the innovator flags, which in the end also leads to

material harm. There are no reasons for apprehensions when paying large amounts. For the majority of creators of something new, who have spent many years on an invention, such a payment in general happens once in a lifetime. But the main thing is that it is necessary to strictly observe legality: if an invention has been used and has yielded a saving, it is necessary to pay for it.

But it is tenacious, this psychological barrier. How else is one to explain, for example, the case of an engineer, who invented a new method of monitoring the technical state of telephone communications channels, which makes it possible to reject expensive equipment. The invention was used by one of the plants. During the 1st year of use the author was paid approximately 1,000 rubles. Then an unusual jump of the economic impact appeared, the invention yielded an enormous profit. The author was to receive a large monetary payment. Right here it turned out that the enterprise did not intend to pay him. The case has dragged on since 1979. There were three trials. And each time they rejected the claim of the inventor, but the RSFSR Supreme Court overturned the decisions on rejection. Here it was noted that each rejection was motivated by a new argument, which completely ruled out the preceding argument.

The psychology "it will come to no good" wittingly or unwittingly also infects legal experts. Thus another problem, an organizational problem, arises: there is no single organ or organization, from which experts would be invited by the court. Judges appoint them through their personal choice. The work of the experts is paid for, they, consequently, are interested in invitations and want to "impress" the court. With what? With their conclusions on the inadvisability of payment or on a small payment. It is not worth shutting one's eyes to this. And what is more: the experts, it would seem, should be specialists in the technical field, to which the invention or efficiency proposal applies. But frequently they do not find such people. In practice the instances, when the same expert today gives a conclusion on an invention in the field of the glass industry, tomorrow--the atomic industry and the day after tomorrow--the shoe industry, are frequent.

The judges are not able, and at times also do not try, to evaluate critically the expert conclusions. The case of S. Sikhuralidze can serve as an example. The steelmaker of the Rustavi Plant and honored efficiency expert of the Georgian SSR, about whom they wrote much in the central and local press, invented a synthetic slag, which provided a saving both from the replacement of fire brick and from the decrease of the crops (the scrap which is remelted) of metal in the ingot head. With respect to the first item with fire brick the reward was paid, but with respect to the second (and the main) item they offended the innovator. The court initially ruled in his favor, but then on the appeal of the plant the decision was overturned, during the new review they turned the author down. Deputy Chairman of the Georgian SSR Supreme Court G. Devdariani initially protested this ruling, then gave in. The case had dragged on for more than 10 years. But meanwhile the method of S. Sikhuralidze is being used no longer only at the Rustavi Plant, it has been introduced at the Orsk-Khalilovo Combine. So far they have not paid the author.

The court enlisted the Institute of Metallurgy of the Georgian SSR Academy of Sciences to make an expert appraisal. Its staff members worked for 14 months, having included the judicial expert appraisal in the plan of scientific work and having drawn up the conclusion in the form of a scientific report. Everything was taken into account in it: both the quality of the metal and the technology, but there is not a word about the saving. The staff members of the institute did not find time to meet and talk with the author. The court trusted the expert appraisal, having cited merely the fact of 14 months of work.

If there were a single expert organ in the country, while specialists of the corresponding fields of knowledge acted as the experts, the stimulation of innovation would be improved greatly. This would also help to specify more clearly the very procedure of the expert appraisal. For the present it is not regulated in any way. Experts avoid enlisting inventors in their own work: suddenly the latter will somehow influence them. It is a strange apprehension. But experts nearly always get involved with economic organizations. For the latter have the technical specifications in their hands.

The time of the making of the expert appraisal is also not stipulated in a single document. The courts do not have any means to hurry up the experts. Therefore, inventors' cases drag on for years. Standard regulation is necessary. The word "lawsuit" is interpreted in two ways: "to contend" and "to drag on." Both are harmful for technical progress and for inventors and efficiency experts.

7807
CSO: 1814/40

SOCIO-POLITICAL FACTORS

SOCIAL CONSEQUENCES OF TECHNOLOGICAL REVOLUTION

Moscow LITERATURNAYA GAZETA in Russian 9 Oct 85 p 14

[Article by LITERATURNAYA GAZETA political commentator Fedor Burlatskiy: "Faust or Prometheus. Reflections on the Social Consequences of the Technological Revolution"]

[Text] "If I choose between Faust and Prometheus, I prefer Prometheus"--this maxim belongs to Balzac, and it was stated with his characteristic uncompromisingness of judgment.

Meanwhile the entire course of the development of mankind shows that the dilemma is not that simple and the choice can hardly be that unambiguous. Prometheus, who revealed, if you believe the legend, the secret of fire to man, became a great symbol of the technical and scientific achievements of civilization. The problem of the meaning of earthly existence and the search for the happiness of man worried Faust.

Of course, the ideal solution is the combination of both principles. But precisely this symbiosis proved to be not at all a simple matter. And not by chance did Goethe's predecessor Jean Jacques Rousseau in a special treatise seek to prove that the progress of science and technology not only does not contribute to the improvement, but, on the contrary, greatly worsens morals. In another treatise he revealed the social causes of this strange phenomenon, seeing them in social inequality.

In our times the dilemma has been accentuated to the extreme. Large, medium-sized, and tiny Prometheuses are endlessly providing mankind with newer and newer technical playthings which take one's breath away. The day before yesterday this was the steamboat, yesterday this was the airplane, today this is the rocket, tomorrow this will be the completely automated plant which is controlled by a minicomputer the size of a little finger.

But what happens in this case with society and with man himself? Is it becoming better, easier, and more interesting for him to live? Is he acquiring new spiritual wealth and, finally, the simple joy of life on earth, which was given to him by nature? Alas, the authors of scientific and technical progress in the West rarely ponder over this. Otherwise would they

really have begun the modern scientific and technical revolution with the invention of the atomic bomb?..

The Future Is Coming Quickly

I thought about all this in connection with the debates which have now flared up again in the United States and Western Europe over the social consequences of the current technological revolution. In this context the development of mini-electronics, information science, and biotechnology is arousing the most thoughts and disputes of all. But a new, even more exotic field--space technology--is already visible ahead.

All these directions are closely interconnected, but each has, of course, its own independent outlet to the social sphere. Therefore, their social consequences are usually examined separately. I would like to attempt to bring together and compare the conclusions of the representatives of various sciences on these problems.

I will dwell on the discussions which were recently organized by three large Western journals. The weekly NEWSWEEK attracted the most well-known futurologists for the discussion of the theme "The Year 2000." Particular attention here was devoted to the development of what is called "home electronics" and the influence which it will have on social and family relations. Such well-known scientists as A. Toffler, the author of the books "Future Shock" and "The Third Wave," Isaac Asimov, the author of 305 books and a professor of biochemistry, and Marvin Cetron, president of an international center of forecasting, who acquired fame by his book "Encounter With the Future" and "Workplaces in the Future," took part in the discussion.

Another journal--SENSE ET VIE--published the comprehensive article "In Search of the Occupations of 2000: Concierge, Truck Driver, or Waiter!..."

Another discussion, which interested me, on the theme "Can Technology Change Society?" was organized recently by the monthly LE MONDE DIPLOMATIQUE, which devoted seven pages of its June issue to the problems of biotechnology.

The participants in the discussions painted a quite vivid and impressive picture of current scientific and technical progress. But here is what distresses and disillusions you, when you read about the results of the conducted research: the astonishing poverty of the opinions on the question, to which the discussions were devoted, namely--What will happen to society and man in 2000 and later--in the 21st century? The impression is that people are taking flight blindfolded. Everyone senses that something magnificent is taking place, but no one knows into what the matter will turn in the future.

Do you remember the fine ballad of Heine about the historical dispute, which the representatives of two religions--Christian and Judaic--waged between each other? So the current discussions on the 21st century are somewhat reminiscent of the religious dispute, the participants in which expound ideas, which have caught their fancy and are poorly connected with real facts. What Einstein said, I must confess, personally impresses me more: "I never think

about the future. It is coming itself quite quickly." Alas, few follow this rule.

"Chips," "Fibers," and Genes

The technological revolution began, by general recognition, with the development of microcomputers. They are called "chips" or "blocks." In the Russian language there is not yet a stable concept which is equal to these names. Most often we use the term "chip."

This is an infinitesimally small calculator, which fits into a case one-fourth the size of a match box. It has the same, and at times greater, possibilities than the first-generation computers which were developed in the 1950's. But the latter computers weighed not less than 30 tons and consumed 150,000 watt-hours of electric power.

Now it is even somehow uncomfortable to remember the kilometers of wires and thousands of tubes, which were concealed in these monsters. It is uncomfortable, because the small "block"--the plate on which the semiconductors, resistors, and all the systems uniting it are installed--is capable of managing and storing tens of thousands of electronic units of information. There are indeed tens of thousands there! Now it is already a question of a quarter of a million, and the time, when the count will come to millions, is not far off. Scientists are discussing the possibility of the development of "biological blocks." Such "miniblocks" will place in 1 cubic centimeter an amount of potential information, which it is possible to compare with the human brain.

Microcalculators can be used in nearly all spheres of human activity. The fact that "chips" cost not tens, but hundreds of fold less than the first computer giants, also contributed to this.

The following data can give an idea of the pace of the advance of microelectronics: from 1978 to 1984 the world semiconductor market increased from approximately $3 billion to $13 billion. In 1980 there were 13,700 robots in the world, while in 1982 there were 31,000. The use of NC machine tools, especially at medium-sized and small enterprises, increased significantly. In 1980 there were already 70,000 of them in the United States, 50,000 in Japan, and 25,000 in the FRG, while in the past 5 years their production has been intensified.

The use of microprocessors is increasing especially rapidly in the sphere of nonphysical production and in offices. The number of such systems in the developed capitalist countries in 1981 was equal to 900,000, while in 1985 it will exceed 9 million.

Fiber thread became another invention which made great changes in the entire system of information science. It is capable of transmitting information through wires the thickness of a human hair, which is radically changing television and telephone information and the means of its storage. This innovation of technological progress, which has received the name of fiber

optical communications, will replace the system which uses hundreds of thousands of kilometers of heavy cable.

The third, extremely promising direction of technological progress is connected with the rapid development of biotechnology. It began in the 1970's with the development of the methods of genetic engineering, and then the rapid development of the technology of the cloning of cellular and tissue cultures. This is making it possible to produce in a planned manner new organisms of animals and plants, which are distinguished by new qualities and functions, by transplanting foreign genes into the cell.

There are convincing forecasts that in the immediate future owing to the new methods of biotechnology just 1 plant will be able to give in 1 year 200,000 shoots, 1 cow during the period of its life will be able to produce 100 calves. Biotechnology will make it possible to increase by many fold the efficiency of agricultural production.

The second "green" revolution, which is based on the use of biotechnology, will lead to a radical change of employment in agriculture. It is possible to see the directions of these changes from the simple comparison of employment in the industrially developed countries, which comes to 5-10 percent of the population, and in the developing countries, where 80 percent of the gainfully employed population up to now works in this area. The sharp decrease of employment in the countryside, which is multiplied by the rapid demographic growth of the population, will cause serious social stresses in the countries of Asia, Africa, and Latin America.

Space is opening a new page--for the present one which in practice is still almost unknown--in the technological revolution. In the newspaper THE FINANCIAL TIMES in the article entitled "The Colonizers of Space" it is reported that already in the 1990's goods, which are produced above the atmosphere, at space plants, will go on sale at ordinary terrestrial stores. The intriguing mark: "Made in Space" will probably be on them.

Thus, minicomputerization, the automation of the leading sectors of industry and agriculture, biotechnology, and space production are the basis of the new technological revolution. And at the same time the basic subject of the reflections, discussions, and disputes between specialists in many countries of the world.

The Raptures of Futurologists

Western futurological thought is now going through, perhaps, a sky blue period: it has risen so far above the sinful problems of the earth, it is "flying" so much from reality, and is subsisting so much on intellectual words about revolutions, changes, mutations, and radical changes, that only the color of the sky can be considered to correspond to its current spirit.

The ideas of well-known futurologist A. Toffler can serve as a sample of such moods. Here is his credo, which was stated during the mentioned discussion: "The longing for a new production system lies deep within us, and this is a tremendous stimulus of social changes, which is so impressive in its scale

that only a few are capable of realizing this.... Given the new industry and production the return to industry at home, but at the highest level of technology with the use of electronics, became possible. It will be possible to take one's residence as the basis and to make it the center of all society.... If 10-20 percent of the labor force takes this historical step in the next 20-30 years, our entire economy, our cities, our ecology, our family structure, our values, and even politics will change beyond recognition."

It is never clear what specifically will happen with society. Another futurologist--Isaac Asimov--also does not clarify this. He predicts: "Employees of 2000, perhaps, will be forced to forfeit half of their salary in order to provide themselves with everything necessary for the new way of life. Those people, whose work computers will now perform, should be retrained."

As for Marvin Cetron, he, like Toffler, is filled with optimism: "By 2000, the high level of the technical revolution will affect all specialties and occupations and will create a boom in the area of the development of new work places."

The Icy Shower of Economists

But now a cold current of calculation is invading such a lively, charming, somewhat Manilovian pursuit of futurologists. Economists are taking in their hands the matter of forecasting the social changes of the technological revolution. And their calculations are making a depressing impression.

Yes, they are also giving the new "electronic civilization" its due. But it is possible to see from the following examples what is happening in this case in the sphere of labor. The owner of one garment enterprise in Great Britain installed electronic equipment in the shops and automated the operations on the marking and cutting of fabric. The number of workers at his enterprise decreased from 200 to 20. In France robots for varnishing doors and cabinets were installed at one of the enterprises. This proved to be half as economical from the point of view of the consumption of varnish. However, at the same time the number of workers was reduced from 100 to 6.

But it is a matter not only of the fact that the technological revolution is stealing work. The fact that it is condemning the working man, in essence, only to the attendance of a machine, is no less dramatic. Microelectronics frees man from physical efforts, from monotonous and dangerous jobs--its merit also lies in this. But it is assuming the functions of human intelligence and its best skills in labor. Its drawback lies in this.

In the printing industry the transmission of text via satellite, as well as electronic make-up are completely depreciating the traditional trade of linotypists and typesetters. The same thing is also happening in mechanics. Robots are appropriating the skill of grinders, lathe operators, and milling machine operators. Robots are behaving especially aggressively in the drafting area. Here they will completely replace man in the immediate future. In the area of engineering drawing and cartography, in case of the drawing up of architectural plans and stylistic diagrams the computer works better than man. And even when the worker controls the automated system, he turns into a

simple assistant of the industrial robot. His task frequently reduces to turning the machine on and off. The machine itself dictates to him its own will and imposes its own decision. Petroleum refineries, power stations, and trains with automatic control, in which the role of the worker consists merely in keeping track of the working order of the system, exist already now. This is very intense work, since any malfunction can lead to a catastrophe, since no professional talents, but only endurance of the nervous system is required of the worker.

The authors of the article "The Occupations of 2000" write that the first results of the technological revolution look as follows:

--on the plus side there are the gain in labor productivity and the gradual disappearance of difficult and dangerous jobs;

--on the minus side there are the loss of workplaces and the more and more mediated quality of jobs, in which genuine competence is no longer required.

"Given a small stratum of technocrats," the authors write, "the bulk of workers consists of more or less passive controllers, of whom it is not even required that they would know how the internal program, which they are attending, is organized." They predict that in the world of tomorrow knowledge will be required for only 1 occupation in 10 and only 1 place in 20 will concern highly developed technology. And here is the sensational conclusion of the researchers: by the end of the century the greatest prospects are afforded for the following specialties--concierges or building guards, cashiers, secretaries, clerks, nurses, waiters, teachers and educators in kindergartens, truck drivers, orderlies in hospitals.

The predictions of Nobel Prize winner Wassily Leontief caused a genuine shock in American public opinion. He claims that by 2000 as a result of the spread of new technology in the United States workplaces will decrease by not less than 20 million. This comes to 11 percent of all the workplaces in the American economy. The situation will be even worse after this point. By 2200-2230, according to the calculations of Leontief, society will have to deal with the situation, when a portion of the active population of America will be provided with work, while the other will be completely placed at the mercy of unemployment. The problem of work itself will become the most urgent problem in society. "From a purely technical point of view," Leontief writes, "this process in many ways is analogous to what happened 50 years ago in agriculture, when they began to replace horses with tractors: gradually these 'conscientious servants' were encompassed by technical unemployment, and then completely disappeared from fields and farms."

And still the authors of the article attempt to conclude their analysis on an optimistic note: "Should one conclude from this that we are preparing a hopeless future for our children? Of course not. And for many reasons. First, because economists are not prophets, their foresight is not the word of God. Moreover, not all economists agree with each other."

That is not much consolation! In essence, the authors lacked the courage to draw truly serious conclusions from the most indisputable data which are cited by them. Let us try to do this for them.

The Criteria of Progress

If scientific and technical progress is a goal, and not a means, then the West is actually creating a modern "electronic" civilization. But what if the discovery of the secrets of nature is only a means, while man, his development, and his happy existence on earth are the goal? Then the "electronic" civilization should be resolutely supplemented by the search for the social and moral ideal. It is possible to see what happens in case of a different approach in the military sphere, in which the West with a kind of satanic frenzy is accumulating more and more horrifying playthings, and not only on earth, but also in space.

But do the ecological consequences of the scientific and technical revolution really not testify to this? "The Planet Retaliates." The journal DER STERN (No 36, 1985) publishes under this title a large and lavishly illustrated article on the unprecedented increase--both in number and in size--of natural catastrophes in the past several years. Although we continue to regard these phenomena as natural, the journal says, they have a quite specific cause--the cutthroat attitude toward nature, the unjustified interference of man in natural laws. According to the calculations of the Red Cross, the number of natural disasters on earth increased from 43 a year (1960) to 81 a year (1979). In the past decade people suffered most of all from drought (244 million), floods (154 million), tropical hurricanes (28 million), earthquakes (12 million). The number of people killed in a year increased by 6.5-fold. The journal cites terrifying examples of the consequences of the unwise interference of man in the ecological system.

In the end the entire matter reduces to what we understand by the progress of human society. I am afraid that modern Western thought has become frantic in dismay before the phenomenon of the technological revolution precisely because it has lost these criteria and today, as strange as this is, is considerably inferior to yesterday and even the day before yesterday in the theoretical conscientiousness of bourgeois society. Here is what the predecessor of Leontief and Toffler, the well-known American philosopher and poet Ralph Waldo Emerson, who lived and wrote in the middle of the past century, said: "The true indicator of civilization is not the level of wealth or the size of cities, not the abundance of the harvest, but the character of the person being raised by the country."

This was a clear criterion and a highly moral criterion. He placed at the center of progress the development of all the best that was built into man by nature and measured the level of civilization precisely by this standard.

During the age, which directly preceded our times, Franklin Roosevelt also advanced his own understanding of the goal of social development: "Our progress is verified not by the plenty of those who already have much, but by whether we are capable of adequately providing those who have too little." If Alvin Toffler and Isaac Asimov had attempted to apply these two criteria to

modern American society, they would probably have come to pessimistic conclusions. The consumption of things--one's own house, one's own car, one's own computer--has become the main goal in life for an overwhelming number of Americans, as well as for the inhabitants of other countries of the West. While indifference to the destitute minority, in which 1 member of society in 10 is unemployed, while almost a third of the population lives below the poverty level, has become the main attribute of neoconservativism.

In other words, Emerson and Roosevelt declared a specific social ideal. From our Marxist point of view, this is a limited ideal, since it is based on the preservation of private property. But still this was a kind of moral model, which did not reduce the matter to the obtaining of the good things in life and the pursuit of money, and especially the disregard of the needs of a significant portion of society.

At present bourgeois philosophical thought, just as, incidentally, artistic thought, is greatly inferior to scientific and technical thought. Apparently, history places in the forefront first one, then another hypostasis of human genius. And whereas in our age there is no Shakespeare, Leonardo da Vinci, and Hegel, there are Einstein and Wiener. Technical genius obviously suppressed artistic and, perhaps, philosophical genius....

The Punishment Is Elitism

Where is the industrial West actually going? First of all I am convinced that this society has made its choice, and has made it for the long-term future. Following Balzac it decidedly preferred Prometheus and is ignoring Faust. Bourgeois society has been engrossed by the technological race, regardless of the social, political, and military consequences to which it will lead. Competition and the pursuit of a profit are doing their work daily and hourly, without looking at the warnings of sensible futurologists. Of course, technological progress is increasing by many fold labor productivity and the diversity of consumer goods and is changing radically the material bases of human existence. But what is happening with social relations? Here is the truly Hamletian question of Western civilization.

It seems that the 21st century already at its start will intensify the elitism of bourgeois society. Technological process for the preservation of the current structure of Western societies will strengthen even more and will make even more insurmountable the barriers which separate various social groups. Along with the elite of wealth and power the technological elite, which forms a closed caste following the example of the Indian Brahmins, will consolidate more and more its position and influence. At the same time computer automation and biotechnology will increase more and more in size the two social groups of people of executive labor who are subordinate to machines. These two groups in some way are reminiscent of the two lower castes in old India--the sudras and the "untouchables."

The first group is workers who attend machines, with a quite low education and social status. Apparently, it will come to not less than 20 percent among the workers in society. The second group is attendants of attendants: guards, waiters, and others, about whom Leontief writes. This group also at the

beginning of the century will probably take up not less than 15 percent. And, finally, a group about which they did not know anything in ancient India. These are the outcasts who are deprived forever of work. This group, given the current growth rate, will include not less than 20 percent.

All this does not necessarily mean a decrease of the level of consumption. Given the increasing abundance of goods it will not be difficult to throw morsels from the banquet table to all strata, even the outcasts. This not only will not decrease, but will underscore even more the dire straits of the people who receive scraps for the fact that they do not work.

Pathetic underlings of the machine or rejected even by it, these groups of the population will be the main sacrifices of the technological revolution. How will the elite feel in this case? To what degree will it sense the tension of the passions, which is arising among its antipodes? What buffered decisions will it make to save the obsolete social structure? The future will show all this.

Whereas earlier we said that the richer are becoming richer and richer, while the poor are becoming poorer and poorer, now it is possible to say that the privileged are becoming more and more privileged, while the deprived are becoming more and more deprived. I have in mind not only the distribution of income, but also such parameters of the quality of life as the distribution of education and social status, participation in government, and moral satisfaction with labor.

In other words, elitism in bourgeois society will intensify and acquire even more dramatic traits. And then a truly social question--on the need for the radical change of the entire social structure--will become especially urgent.

In the postscript I would like to say a few words about several lessons which follow for us from foreign experience. The first and main one is: we should clearly imagine not only the gigantic possibilities for the development of the productive forces and the well-being of the people, which the new technological revolution promises, but also the difficult problems which are arising in the process of its penetration into the fabric of social life. These are the problems of the retraining and occupational reorientation of large groups of workers; these are the problems of small enterprises, as well as the development of home forms of labor activity; these are the problems of the computerization of management and the radical change of the nature of the labor of employees; these are ecological and many other problems. It is quite obvious that the plans of technological modernization, which are being outlined in our country, should already today be supplemented by thoroughly analyzed scientific plans of social changes. Then we will be able in practice to use the achievements of the technological revolution and to reduce to nought the negative phenomena accompanying it, so that Prometheus and Faust would complement, and not oppose, each other.

7807
CSO: 1814/40

REGIONAL ISSUES

LATVIAN ACHIEVEMENTS IN PRODUCTION INTENSIFICATION VIEWED

Riga SOVETSKAYA LATVIYA in Russian 13 Aug 85 p 2

[LATINFORM article: "To the Path of Intensive Development"; first paragraph is SOVETSKAYA LATVIYA introduction]

[Text] The interest of labor collectives and all the units of the national economy in the speeding up of the use of valuable innovations, retooling, and the acceleration of the pace of the development of social production is increasing. The instructions of the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress and the decree of the CPSU Central Committee and the USSR Council of Ministers "On the Extensive Dissemination of New Methods of Management and the Increase of Their Influence on the Acceleration of Scientific and Technical Progress" aim at entering the new five-year plan with a high labor rhythm. How this task is being accomplished in our republic, what problems still exist--this is spoken about in the materials published below.

The Importance of Coordination

First Secretary of the Moskovskiy Rayon Committee of the Communist Party of Latvia N. N. Leonov

We can and should, it was noted at the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress, obtain from science an even greater return. Life itself requires that it be turned resolutely toward the needs of social production and that production be turned toward science.

In our rayon, in which the headquarters of academic science of the republic is located, this problem is of particular importance. As is known, 15 scientific research institutes, 3 experimental plants, and 6 special design bureaus, within which there are highly skilled scientists, belong to the Academy of Sciences. Such modern equipment as a nuclear reactor, electron microscopes, and electronic computer technology are at their disposal. All this taken together constitutes a significant scientific potential. It would also be unwise not to use it for the needs of industry of the rayon. Meanwhile previously the contacts of academic science with production left much to be desired in the rayon. For production workers the plan of the output of

products was frequently in first place, for scientists theoretical problems were.

Following the adoption in July of last year by the Buro of the Latvian CP Central Committee of the decree on the retooling of the enterprises of Moskovskiy Rayon and the increase of product quality work was done on reviving the contact of science with production. For this purpose a coordinating council, of which scientists, managers, and technical specialists became members, was established under the rayon party committee. It began its work by inspecting most closely a number of enterprises of the rayon and ascertaining the possibility of the direct cooperation with them of institutions of the Academy of Sciences. The group of questions and the themes of the most important problems were determined. These are the protection of components and equipment against corrosion, the use of production scraps and environmental protection, the automation and robotization of production, the use of new materials.

The council acquainted the corresponding institutes and special design bureaus of the republic Academy of Sciences with these directions, so that their staff members would think over with specifically what they will be able to help production. And such suggestions were soon received. Contracts on scientific and technical cooperation and economic contracts became the basic forms of the contact of institutes of the Academy of Sciences with enterprises of the rayon. The Antikor Experimental Design and Technological Bureau of the Academy of Sciences, for example, is performing a large amount of work for enterprises of the rayon. With the aid of this collective a rust modifier was introduced at the plants of Spetsstalkonstruktsiya and the pilot plant of the republic Ministry of Consumer Services. Scientists also submitted proposals on the protection of production equipment against corrosion at the Latviya and Mara associations, the association of art accessories, the porcelain plant, and the Rigas filtss Factory.

As a result of the activity of the resourceful group of the coordinating council work was begun on the study of the possibilities of using scraps of rubber at the Sarkanays kvadrats Association. In particular, a compound for coating the bottom of the bodies of motor vehicles was developed. Tests on the replacement of a scarce filler of rubber--chalk--are being conducted at the association jointly with the Institute of Polymer Mechanics. A technology of producing cases of items from glass-reinforced plastic, which made it possible to replace an expensive alloy and to obtain in so doing an economic impact of 45,000 rubles, was developed by this institute jointly with the Riga Plant of Hydrometric Instruments.

Scientists of the Physics and Power Engineering Institute did some good work for the practical needs of the heat supply of the city. They turned over to the Siltums Enterprise of Heat Networks more than 200 heat regulators which were produced by the pilot works. Their use under the real conditions of the heat networks of the city is extremely efficient: it is making it possible to save up to 20 percent of the fuel.

It is possible to continue the list of spheres and results of cooperation, but I believe that it is also evident from the cited examples how effective and useful it can be.

At the same time it is necessary to do much more on this level, for only the first steps have been taken. It is important, when broadening the boundaries of the cooperation of production workers with scientists, to go into the depths. Economic managers should display great interest in the further development of relations with science and draw engineering and technical personnel and production innovators more persistently into this orbit. Party organizations also cannot stand aloof. At the meetings of party committees and party buros it is necessary to hear more often the chief specialists of enterprises on questions of the relations with science.

At the conference in the CPSU Central Committee the task was posed to turn academic institutes sharply in the direction of the expansion of research which has a technical orientation. Scientists cannot but take into account that today the renovation and retooling of operating enterprises are becoming the main direction of the development of industry. In this connection the development of the cooperation of the robotics center of the republic Academy of Sciences with enterprises of the rayon within the framework of the corresponding republic scientific and technical program has been planned. For the purpose of studying the possibilities of robotization the coordinating council inspected the Sarkanays kvadrats Association, the porcelain plant, the plant of hydrometric instruments, the Yauda and Stankonormal plants, the Rigas filtss Factory, and a number of others. The introduction at these enterprises of automated lines, industrial robots, and microprocessor equipment will be another step forward in the direction of the acceleration of the pace of scientific and technical progress and the solution of the fundamental problems of the increase of production efficiency.

Speed Up the Introduction of Scientific Developments

O. Ya. Danovskiy, chief of the Administration of Science and the Training of Scientists of the Latvian SSR Ministry of Higher and Secondary Specialized Education

The higher school of the republic has a significant scientific potential for the performance of the most diverse research in the interests of the national economy. Scientists of higher educational institutions are taking part in the implementation of 37 all-union, republic, and sectorial comprehensive programs. Annually about 300 developments of higher educational institutions are introduced in production with a total economic impact of more than 13 million rubles. Many of them--new materials, instruments, automated systems for various purposes--are being used successfully in the republic national economy.

Thus, the use at the Alfa Production Association of the unit for the functional adjustment of integrated circuits, which was developed at the Latvian State University imeni P. Stuchka, made it possible to increase labor productivity in this operation by nearly thirtyfold and to obtain an economic impact of about 800,000 rubles. The contact heat exchanger with an active

packing, with was developed at Riga Polytechnical Institute imeni A.Ya. Pelshe, is also distinguished by great efficiency. Its pilot industrial operation at the boiler house of the Riga Porcelain Plant showed that it provides a saving of natural gas in the amount of up to 600,000 cubic meters a year from 1 unit. The cost of the unit itself comes to only 7,000 rubles.

At the same time much research performed at higher educational institutions is not being introduced in the republic or is not being used extensively enough. Thus, so far the electronic stabilizer of the rotational speed of low-power electric motors, which increases the reliability of electric hand tools and the convenience of work with them, has not been introduced. Several prototypes have been turned over to the Rezekne Elektrostroyinstrument Production Association, but so far the series production of the innovation has not been assimilated. The method of shear pipe welding, which makes it possible to reliably unite the most different metals which do not lend themselves to welding by other methods, has also not been introduced in the republic. This method is distinguished by the simplicity of the technology and a low materials-output ratio. After the unsuccessful attempts at its introduction in the republic it was assimilated at enterprises of the Ukraine. The pneumatic hammer with drastically decreased vibration, which was developed at Riga Polytechnical Institute and about which construction workers dream, also did not interest anyone in the republic.

Several developments have remained too long in the rank of prototypes and are being introduced at only one enterprise. For the present the method of the presowing heat treatment of vegetable seeds, which was developed at the university, is being used only on test plots. The "two-armed" robot with pneumatic drive, which was developed at Riga Polytechnical Institute and is being used at only one enterprise of local industry, can find more extensive use.

One of the factors, which are checking the introduction of a significant portion of our applied developments, is the low-capacity pilot experimental base of higher educational institutions. The meager work areas do not make it possible to accommodate the design services, modern equipment, or specialized sections, which are necessary for the production of prototypes of technically complex items. Unfortunately, the sectorial ministries are not agreeing to the organization at their work areas of experimental bases or sectorial laboratories of higher educational institutions. Only the republic Ministry of Light Industry and Ministry of Construction have sectorial laboratories at Riga Polytechnical Institute, which are conducting research for the needs of these sectors. The inadequate information from ministries, enterprises, and organizations on the need for the conducting of some scientific research or other is also hindering the work.

Of course, much in the improvement of the unified "research--development--introduction" chain also depends on ourselves. We believe that it is more advisable to conduct the applied research and development, which are being performed by higher educational institutions for various sectors, on the basis of economic contracts. But the existing practice of concluding occasional economic contracts with individual enterprises does not justify itself. We should, apparently, change over to the path of the conclusion of comprehensive

contracts with republic and union republic ministries and departments, envisaging in these contracts not only the fulfillment of scientific developments and their introduction in sectors, but also the special-purpose training of personnel and the use of young specialists.

What is called "scientific service" is another factor which is capable of increasing the efficiency of scientific research at higher educational institutions. The prevalent practice today of a "natural economy," when every higher educational institution and every scientific institution and chair of a higher educational institution strive by all means to acquire their own research base, leads to an increase of the expenditures on scientific equipment and, in a number of cases, to its inefficient use.

The experience of the leading higher educational institutions of the country and a number of socialist countries convincingly attests to the advantage of the organization of joint centers of the service of scientific research of higher educational institutions. The need has also arisen to establish such a center for the higher educational institutions of our republic. The assets invested in its establishment will be recovered by the sharp decrease of the expenditures on scientific equipment, by its better use and, in the end, by the increase of the efficiency of scientific research itself.

Innovative Sailors Are Searching

Chief Engineer of the Latvian Maritime Shipping Company, USSR State Prize winner V. G. Agafonov

In a few days the steamship Balashov will set out on its last voyage. This is the last ship with a steam engine, which is registered with the port of Riga. The latest tankers, container ships, gas carriers, and chemical carriers with modern internal combustion engines are succeeding it. This year alone the new motorships Moris Bishop and Yuliy Danishevskiy made their maiden voyages. The tankers Zhan Griva and Oyar Vatsiyetis, the banana carrier Akademik Vavilov, and other ships will soon be commissioned.

The questions of the introduction of new equipment on ships, in ports, and at repair enterprises were always at the center of attention of the technical services and the entire collective of the shipping company. The innovators of the shipping company are making a large contribution to the increase of production efficiency, labor productivity, and the saving of manpower and material resources and to the decrease of the cost of the transportation and handling of cargo. The proposals, which were elaborated and introduced by them, and in 1984 there were more than 1,500 of them, last year provided an economic impact of 1.9 million rubles. Owing to the innovators more than 33,000 kilowatt-hours of electric power and thousands of tons of fuel were saved.

The crews of ships are daily devoting much attention to questions of the improvement of fuel consumption. Owing to this nearly all the engines on motorships run on so-called heavy inexpensive grades of fuel. Secondary resources and the recovery of petroleum residues are being used extensively on the ships.

New equipment has also firmly taken a dominant place on shore. The handling of containers at Riga Port at the terminal, which was built on Kundzinsal Island, has been completely mechanized. Electronic traffic controllers have become faithful assistants of the dockers and sailors. This immediately told in the decrease of the mooring time of container ships.

A public design bureau is working actively at the Riga Ship Repair Yard. Leading specialists and innovators of the enterprise belong to it. New technological processes, which increase the quality of ship repair and are speeding up the commissioning of the icebreaking ferries being built for fraternal Estonia, are being introduced with their assistance.

The decisions of the April (1985) CPSU Central Committee Plenum and the conference on the acceleration of scientific and technical progress also clearly showed our unsolved problems. One of them is the disproportion between the work of the highly mechanized container terminal and the lack of a railroad station in its vicinity. The capacities of the Riga-Krasta Station are not meeting the needs of the port, they are slowing down the transshipment of cargo and the making up and dispatching of trains. But the construction of a new station is being proposed by the USSR Ministry of Railways only in the middle of the next five-year plan. The ship repairmen also have to solve many problems. These are first of all the shortening of the repair time of ships, the increase of the quality of repair, the questions of the introduction of brigade methods of labor by entire sections, the mechanization of labor-consuming jobs in the repair and building of ships, and closer contacts with scientists.

7807
CSO: 1814/40

REGIONAL ISSUES

LATVIAN ACADEMY GENERAL ASSEMBLY VIEWS KEY R&D DIRECTIONS

Riga SOVETSKAYA LATVIYA in Russian 15 Nov 85 pp 1, 3

[Article: "General Assembly of Latvian Academy Views Key R&D Directions"]

[Abstract] The article reports on proceedings of the general assembly of the Latvian Academy of Sciences, which took place in Riga on November 14. A report given by academician B.A. Purin, president of the Latvian academy, is summarized. A number of institute heads who spoke during the discussion of the report are identified.

In his report, Purin reviewed results of work by academy scientists in recent years, surveyed tasks for accelerating scientific-technical progress in the republic, and commented on the academy's role and responsibilities in this connection. He stressed the importance of advancing exploratory and basic research at pacesetting tempos, and of focusing efforts on main directions which meet the economy's most urgent needs and promote high performance by industry. High-priority directions were said to include the synthesizing of preparations for medicine and agriculture; development and application or new materials; information science and computer technology; and robotics and machine building.

A number of promising areas of research are to receive particular attention in the next 15 years, Purin reported. They include the study of molecular principles of the genetics of disease-producing microorganisms and viruses; investigation of new means of diagnosing and treating illnesses; active substances, including prostaglandins, antibiotics, enzymes and hormones. Other directions of work which are to be advanced include development and use of composite and other materials with valuable properties, in line with the long-range program "Employment of Polymer Materials, Including Polyurethanes, in the Republic's Economy"; retooling of metallurgical enterprises; obtaining effective materials for semiconductor technology and optoelectronics; developing new-generation magnetohydrodynamic equipment for nuclear and thermonuclear power engineering; and molecular-electronics research aimed at developing materials in which electric signals are generated and converted on the molecular level. Purin noted that the academy is called upon to achieve major results in the field of computer technology, including development of new equipment for controlling production processes and scientific experiments.

Purin went on to assess progress in improving the organization and equipping of academy R&D and the training of scientific personnel. The creation of a number of research-and-production complexes reportedly is planned for the purpose of better coordinating the work of introducing new technology. Pointing out that institutes need suitable experimental-industrial facilities in order to work effectively, Purin noted that the majority of the academy's special design-and-technological bureaus and experimental plants require radical reconstruction and retooling.

7807
CSO: 1814/54

REGIONAL ISSUES

GENERAL ASSEMBLY OF ARMENIAN ACADEMY OF SCIENCES

Yerevan KOMMUNIST in Russian 16 Nov 85 p 1

[Article: "General Assembly of Armenian Academy of Sciences"]

[Abstract] The article reports on proceedings of a general assembly of the Armenian Academy of Sciences which took place on November 14. Tasks for accelerating scientific-technical progress in the Armenian republic were discussed. A report given by V. Ambartsumyan, president of the Armenian academy, is summarized.

It was noted at the assembly that the Armenian academy has made a substantial contribution to metallurgy, electronics, machine building, chemical engineering, instrument building and other branches of industry. Ambartsumyan mentioned a number of academy organizations where notable advances have been made recently. At the Institute of Applied Physics Problems, for example, work on x-ray acoustic methods provided a basis for development of equipment that is now widely used. Radiometric instruments which have earned a good reputation were developed on the basis of work done at the Institute of Radiophysics and Electronics. Unique, extra-sensitive instruments were developed at this institute for the international program "Venera--Galley".

Ambartsumyan also called attention to directions of research at academy organizations which he said need more support, and he discussed ways of improving science-industry ties in key areas. In particular, he recommended that inter-agency research-and-production associations be created for the purpose of broadening physics and chemistry institutes' cooperation with industrial organizations in the republic. Mention was made, in this connection, of problems with the production of pure and superpure reagents. These problems were discussed at a recent session of the USSR Academy of Sciences. Ambartsumyan recalled that the Armenian academy's Institute of Organic Chemistry and the Yerevan affiliate of the All-Union Institute of Chemical Reagents proposed that a research and production association be organized for the purpose of remedying this situation, since the chemical-reagents plant in the republic does not produce reagents that are really superpure. He called for serious study of this question by the Armenian academy's Department of Chemical Sciences and by other concerned agencies.

Other principal speakers at the assembly are identified. Among them were G. Garibyan, academician-secretary of the academy's Department of Physical-Mathematical Sciences; S. Matsoyan, member of the Armenian academy and director of the Institute of Organic Chemistry; and Doctor of Physical-Mathematical Sciences R. Martirosyan, director of the Institute of Radiophysics and Electronics.

7807
CSO: 1814/54

AWARDS AND PRIZES

WORK ON DISORDERED SYSTEMS NOMINATED FOR UKSSR STATE PRIZE

Kiev PRAVDA UKRAINY in Russian 17 Oct 85 p 2

[Article by Academician of the Ukrainian SSR Academy of Sciences B. Verkin, winner of the USSR and Ukrainian SSR State Prizes, and Corresponding Member of the Ukrainian SSR Academy of Sciences V. Manzhelin, winner of the USSR and Ukrainian SSR State Prizes, under the rubric "For the Ukrainian SSR State Prize": "A New Field of Physics"]

[Text] The development of a number of sectors of modern industry--from metallurgy to solid-state electronics and many sections of solid-state physics and chemistry--involved, as a rule, the use of quite pure substances. It seemed that only they can guarantee the stability of properties. Therefore, "admixture" implied something undesirable. However, in metallurgy, for example, this word is a synonym of "additive" and signifies alloying--the special adding to a quite pure metal of another substance which imparts to the metal new useful properties.

In the past 2 decades alloyed substances have been used more perceptibly in semiconductor physics and technology. Precisely the extrinsic properties are responsible for the most important semiconductor instruments. However, the admixtures in a doped semiconductor are distributed, as a rule, in an irregular, chaotic manner, its properties are only partially similar to the properties of an ordered object--the ideal crystal. Such a semiconductor itself is, as is now customary to say, a disordered system. Various glasses (dielectric, semiconductor, metallic, magnetic, superconducting), several biological objects, substances which are in an amorphous state, and materials which have been exposed to intense radiation (the parts of spacecraft, nuclear reactors, and so forth) are examples of them.

Disordered materials are finding the most extensive use in modern equipment. Vitreous semiconductors are used in the production of elements of the memory of computers. The photoelectric properties of a number of amorphous substances make them very promising for the development of efficient solar batteries and highly sensitive television transmission equipment.

Further progress is inconceivable without a thorough set of theoretical notions. Therefore, the efforts of physicists of the entire world are aimed at formulating a theory of disordered systems.

The works of Academician Ilya Mikhaylovich Lifshits and his school have made a substantial contribution. They are devoted to a basic question--the laws of the motion of the smallest carriers of the various properties of solids--electrical, magnetic, elastic, and so forth. It turned out that these laws in disordered systems are characterized by a large number of fundamentally new features. It was necessary to develop in essence a new field of theoretical condensed-state physics.

All the stages of the formation of new scientific directions--from the elaboration of the basic concepts to the formation of powerful methods of research and the obtaining of important specific results--were covered in the works of I.M. Lifshits and his students, S.A. Gredeskul and L.A. Pastur.

The many years of basic research are summarized in the monograph "Vvedeniye v teoriyu neuporyadochennykh sistem" [Introduction to the Theory of Disordered Systems]. Being based to an overwhelming degree on original works of the authors--leading specialists of the theory of disordered systems, who are recognized both in our country and abroad--at the same time it fundamentally includes the most important achievements of other researchers. As a result an integral and the only handbook in world literature on the theory of disordered systems was produced.

There is no doubt that the monograph is a fundamental contribution to domestic and world science.

7807
CSO: 1814/51

AWARDS AND PRIZES

STUDIES IN THERMODYNAMICS NOMINATED FOR UKSSR STATE PRIZE

Kiev PRAVDA UKRAINY in Russian 18 Oct 85 p 2

[Article by Vice President of the Ukrainian SSR Academy of Sciences V. Trefilov under the rubric "For the Ukrainian SSR State Prize": "Predict the Behavior of Materials"]

[Text] The intensive development of semiconductor, optical, and space engineering, advanced chemical and metallurgical technologies, power engineering, and electronics is inconceivable without new materials with a set of properties which are frequently unique. A conscious and goal-oriented approach to the development of materials with preset properties is impossible without a knowledge of the fundamental thermodynamic characteristics of substances.

The laws of chemical thermodynamics make it possible to solve many most important technological and design problems: to determine the conditions under which the process of interest is possible; to ascertain the compatibility of various substances with each other and the environment; finally, to draw up heat balances of various processes. Such data are important for the improvement and the development of new metallurgical processes, the choice of efficient modes of the synthesis of materials with preset properties and the optimum conditions of their use, and the development of new composite materials. It is also possible to judge the role of reliable thermodynamic information from the following fact--a special center of data on the thermodynamic properties of substances (the Termotsentr of the USSR Academy of Sciences) has been established in our country in the system of the Academy of Sciences.

Back in the early 1950's at Kiev State University and the laboratory of special alloys of the Ukrainian SSR Academy of Sciences Academician of the Ukrainian SSR Academy of Sciences V.N. Yeremenko organized the first experiments on the study of the thermodynamic properties of metal alloys. The research then underwent extensive development at the Institute of Problems of Material Science of the Ukrainian SSR Academy of Sciences, the Kiev Technological Institute of the Food Industry, and the Kramatorsk Industrial Institute. In these scientific collectives unique equipment was developed and a number of original methods for determining the thermodynamic properties of substances were formulated. New laws, which link the thermodynamic properties

of alloys and compounds with the metal chemistry characteristics of components, were established.

The data on the thermodynamic properties of about 2,000 substances were critically analyzed and generalized in numerous articles, collections, and monographs. A large portion of the information has been fed into the ASTRA automated system of thermodynamic calculations of the special design and technological bureau of the Institute of Problems of Material Science of the Ukrainian SSR Academy of Sciences and is a part of the reference collection of CEMA. They have been included in basic thermodynamic reference publications in our country and abroad.

Such results are being used in elaborating the optimum conditions of the synthesis of refractory compounds and in developing high-temperature heaters, special ceramics, refractory materials, carriers of catalysts, highly efficient cathodes, and protective coatings. The thermodynamic research conducted in recent years by the Institute of Problems of Material Science of the Ukrainian SSR Academy of Sciences in close contact with scientists of a number of higher educational institutions of the republic has been nominated for the Ukrainian SSR State Prize. In the breadth of coverage of various classes of substances, the perfection of the experimental equipment, and the depth of the scientific generalizations it holds a leading place in the field of the high-temperature thermodynamics of inorganic materials.

7807
CSO: 1814/51

AWARDS AND PRIZES

WORK ON SECONDARY RESOURCES NOMINATED FOR UKSSR STATE PRIZE

Kiev PRAVDA UKRAINY in Russian 30 Oct 85 p 3

[Article by Vice President of the Ukrainian SSR Academy of Sciences V. Trefilov under the rubric "For the Ukrainian SSR Prize": "Scraps Into Use"]

[Text] At the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress the task was posed to satisfy 75-80 percent of the increase of the need of the national economy for fuel, raw materials, and materials by saving. The radical improvement of the use of secondary resources is the main direction.

In light of this the work "The Organization of the Industrial Introduction of Technological Systems and Complexes for the Efficient Use of Secondary Resources and Production Scraps in the National Economy of the Ukrainian SSR" is of great national economic importance. The high level of use of secondary resources on the basis of new technological systems and an extensive set of organizational, economic, and technical measures, which are aimed at the introduction of resource-saving technologies, also constitute its basic merit.

The organizational work, which was performed by the Ukrainian SSR State Planning Committee and the Ukrainian SSR State Committee for Material and Technical Supply during the 11th Five-Year Plan, made it possible to increase the amount of use of secondary resources in 1984 to 153 million tons (12 percent of the total volume of resource consumption of the republic). At present 85 types of secondary resources are being used (for the country for the present 40 are being used).

The experience of the organization by the Ukrainian SSR State Committee for Material and Technical Supply of a permanent thematic exhibition, at which along with positive examples of the efficient use of material resources cases of a wasteful attitude toward national property are shown and the reserves of saving and means of decreasing the materials-output ratio are revealed, merits special attention.

As a whole for the republic 6.7 million cubic meters of commercial lumber, 166,000 tons of cotton, wool, and other fibrous materials, 170,000 tons of soda ash, 30,000 tons of synthetic rubber, and 850,000 tons of crude petroleum were saved for the national economy.

A qualitative leap occurred owing to the creation of the industrial base of scrap processing. During the 11th Five-Year Plan large modern enterprises were built and are being developed, for example, the Kiev Cardboard and Paper Combine, 11 factories for the industrial processing of secondary textile raw materials, a works, at which secondary polymer materials are being put to use, and regional centers for the production of metal products with an increased production readiness.

The following indicators give an idea of the scale. Since the beginning of the 11th Five-Year Plan 550 million tons of secondary resources and scraps have been committed to industrial production, which is 1.3-fold more than during the 10th Five-Year Plan. Products worth 13.5 billion rubles were produced with their use.

In the breadth of the coverage of the problem of using secondary resources in the republic on the basis of the latest achievements of scientific and technical progress and in the scientific approach the submitted work makes a significant contribution to the supply of the national economy of the republic with material resources.

7807
CSO: 1814/51

AWARDS AND PRIZES

WINNERS OF 1985 USSR STATE PRIZES IN SCIENCE, TECHNOLOGY

Moscow PRAVDA in Russian 7 Nov 85 pp 1, 3-4

[Decree of the CPSU Central Committee and the USSR Council of Ministers "On the Awarding of the 1985 USSR State Prizes in Science and Technology"]

[Text] Having considered the proposal of the Committee for Lenin Prizes and USSR State Prizes in Science and Technology attached to the USSR Council of Ministers, the CPSU Central Committee and the USSR Council of Ministers resolve:

to award the 1985 USSR State Prizes to:

I. In Science

1. Candidate of Physical Mathematical Sciences Garri Semenovich Baronov, senior scientific associate of the Institute of Atomic Enegry imeni I.V. Kurchatov; Corresponding Member of the USSR Academy of Sciences Leonid Nikolayevich Kurbatov, chief of a chair of the Moscow Physical Technical Institute; Candidate of Physical Mathematical Sciences Aleksandr Dmitriyevich Britov, senior scientific associate of the same institute; Doctor of Physical Mathematical Sciences Boris Andreyevich Volkov, Candidate of Physical Mathematical Sciences Ivan Ivanovich Zasavitskiy, Candidate of Chemical Sciences Galina Aleksandrovna Kalyuzhnaya, senior scientific associates of the Physics Institute imeni P.N. Lebedev of the USSR Academy of Sciences; Doctor of Physical Mathematical Sciences Aleksey Petrovich Shotov, chief of a sector of the same institute; Doctor of Physical Mathematical Sciences Yuriy Vasilyevich Kosichkin, chief of a laboratory of the Institute of General Chemistry of the USSR Academy of Sciences; Candidate of Physical Mathematical Sciences Aleksandr Ivanovich Nadezhdinskiy, senior scientific associate of the same institute; Candidate of Physical Mathematical Sciences Vsevolod Grigoryevich Koloshnikov, chief of a laboratory of the Institute of Spectroscopy of the USSR Academy of Sciences; Candidate of Physical Mathematical Sciences Yuriy Aleksandrovich Kuritsyn, senior scientific associate of the same institute; Candidate of Physical Mathematical Sciences Vyacheslav, Useinovich Khattatov, chief of a department of the Central Aerological Observatory--for the series of works "Tunable A1UVU1 Semiconductor Lasers and High-Resolution Molecular Spectroscopy on Their Basis," which were published during 1967-1983.

2. Doctor of Physical Mathematical Sciences Lev Mikhaylovich Blinov, chief of a laboratory of the Institute of Crystallography imeni A.V. Shubinkov of the USSR Academy of Sciences; Doctor of Physical Mathematical Sciences Sergey Alekseyevich Pikin, senior scientific associate of the same institute; Doctor of Physical Mathematical Sciences Igor Nikolayevich Kompanets, Doctor of Technical Sciences Nikolay Filippovich Kovtonyuk, senior scientific associates of the Physics Institute imeni P.N. Lebedev of the USSR Academy of Sciences; Candidates of Physical Mathematical Sciences Anatoliy Aleksandrovich Vasilyev and Aleksandr Vsevolodovich Parfenov, junior scientific associates of the same institute; Academician of the Belorussian SSR Academy of Sciences Vladimir Antonovich Pilipovich, Candidate of Physical Mathematical Sciences Anatoliy Anatolyevich Kovalev, chiefs of laboratories of the Institute of Electronics of the Belorussian SSR Academy of Sciences; Doctor of Physical Mathematical Sciences Mikhail Petrovich Petrov, deputy director of the Physical Technical Institute imeni A.F. Ioffe of the USSR Academy of Sciences; Candidates of Physical Mathematical Sciences Sergey Ivanovich Stepanov and Anatoliy Vasilyevich Khomenko, senior scientific associates of the same institute; Candidate of Chemical Sciences Vitaliy Mikhaylovich Skorikov, senior scientific associate of the Institute of General and Inorganic Chemistry imeni N.S. Kurnakov of the USSR Academy of Sciences--for basic research of photorefractive and liquid crystals for optical data processing systems.

3. Candidate of Physical Mathematical Sciences Yevgeniya Andreyevna Zabolotskaya, junior scientific associate of the Institute of General Physics of the USSR Academy of Sciences; Doctor of Physical Mathematical Sciences Lev Konstantinovich Zarembo, senior scientific associate of Moscow State University imeni M.V. Lomonosov; Doctor of Physical Mathematical Sciences Vladimir Aleksandrovich Krasilnikov, chief of a chair, Doctor of Physical Mathematical Sciences Oleg Vladimirovich Rudenko, docent, associates of the same university; Corresponding Member of the USSR Academy of Sciences Vitaliy Anatolyevich Zverev, deputy director of the Institute of Applied Physics of the USSR Academy of Sciences; Doctor of Physical Mathematical Sciences Lev Aronovich Ostrovskiy, chief of a laboratory, Candidate of Physical Mathematical Sciences Aleksey Ivanovich Kalachev, senior scientific associate, workers of the same institute; Doctor of Physical Mathematical Sciences Leonid Mikhaylovich Lyamshev, deputy director of the Acoustics Institute imeni Academician N.N. Andreyev of the USSR Academy of Sciences; Doctor of Physical Mathematical Sciences Andrey Vladimirovich Rymskiy-Korsakov, chief of a department, Doctor of Physical Mathematical Sciences Konstantin Aleksandrovich Naugolnykh, chief of a sector, associates of the same institute; Doctor of Technical Sciences Vladimir Ivanovich Timoshenko, chief of a chair of the Taganrog Radio Engineering Institute imeni V.D. Kalmykov; Academician Rem Viktorovich Khokhlov--for the series of works "The Development of the Physical Principles of Nonlinear Acoustics and Its Applications," which were published during 1955-1983.

4. Corresponding Member of the USSR Academy of Sciences Nikolay Sergeyevich Bakhvalov, chief of a chair of Moscow State University imeni M.V. Lomonosov; Doctor of Physical Mathematical Sciences Boris Yefimovich Pobedra, professor of the same university; Corresponding Member of the USSR Academy of Sciences Vladimir Vasilyevich Bolotin, chief of a laboratory of the Institute of Machine Science imeni A.A. Blagonravov of the USSR Academy of Sciences;

Academician of the Ukrainian SSR Academy of Sciences Aleksandr Nikolayevich Guz, director of the Institute of Mechanics of the Ukrainian SSR Academy of Sciences; Candidate of Technical Sciences Aleksandr Aleksandrovich Dudchenko, docent of the Moscow Aviation Institute imeni Sergo Ordzhonikidze; Doctor of Technical Sciences Nikolay Petrovich Yershov, chief of a chair of Chelyabinsk Polytechnical Institute; Candidate of Technical Sciences Aleksandr Boleslavovich Mitkevich, docent of the Moscow Aviation Technological Institute imeni K.E. Tsiolkovskiy; Candidate of Technical Sciences Sergey Nikolayevich Shevchenko, senior scientific associate of the same institute; Corresponding Member of the Latvian SSR Academy of Sciences Vitaut Petrovich Tamuzh, deputy director of the Institute of Polymer Mechanics of the Latvian SSR Academy of Sciences; Corresponding Member of the USSR Academy of Sciences Aleksandr Kristapovich Malmeyster, Doctor of Technical Sciences Yuriy Matveyevich Tarnopolskiy, directors of laboratories, Doctor of Technical Sciences Gundaris Aleksandrovich Teters, chief of a department, associates of the same institute--for a series of works on the development of methods of designing components made from composite materials.

5. Doctor of Physical Mathematical Sciences Boris Leonidovich Rozhdestvenskiy, senior scientific associate of the Institute of Applied Mathematics imeni M.V. Keldysh of the USSR Academy of Sciences; Academician Nikolay Nikolayevich Yanenko--for the monograph "Sistemy kvasilineynykh uravneniy i ikh prilozheniya k gazovoy dinamike" [Systems of Quasilinear Equations and Their Applications to Gas Dynamics], which was published in 1978 (2d edition).

6. Doctor of Chemical Sciences Vadim Ivanovich Nefedov, chief of a laboratory of the Institute of General and Inorganic Chemistry imeni N.S. Kurnakov of the USSR Academy of Sciences; Academician of the Ukrainian SSR Academy of Sciences Vladimir Vladimirovich Nemoshkalenko, deputy director of the Institute of Metal Physics of the Ukrainian SSR Academy of Sciences; Doctor of Physical Mathematical Sciences Valentin Grigoryevich Aleshin, chief of a department of the Institute of Superhard Materials of the Ukrainian SSR Academy of Sciences; Candidate of Physical Technical Sciences Vladimir Mikhaylovich Kulakov, senior scientific associate of the Institute of Atomic Energy imeni I.V. Kurchatov; Doctor of Technical Sciences Viktor Aleksandrovich Trapeznikov, director of the Physical Technical Institute of the Ural Scientific Center of the USSR Academy of Sciences; Candidate of Physical Mathematical Sciences Irina Nikolayevna Shabanova, chief of a laboratory of the same institute; Doctor of Physical Mathematical Sciences Ilya Grigoryevich Kaplan, chief of a department of the Scientific Research Institute of Physical Chemistry imeni L.Ya. Karpov; Doctor of Chemical Sciences Aleksey Georgiyevich Akimov, senior scientific associate of the Institute of Physical Chemistry of the USSR Academy of Sciences; Doctor of Physical Mathematical Sciences Fedor Ivanovich Vilesov--for the series of works "The Development of the Method of Photoelectronic Spectroscopy and Its Application in Science and Technology," which were published during 1961-1983.

7. Doctor of Technical Sciences Aleksandra Vasilyevna Volokhina, Doctors of Chemical Sciences Margarita Mikhaylovna Iovleva and Valeriy Grigoryevich Kulichikhin, chiefs of laboratories of the Khimvolokno Scientific Production Association; Doctor of Chemical Sciences Sergey Prokofyevich Papkov, chief of

a department of the same association; Corresponding Member of the USSR Academy of Sciences Nikolay Alfredovich Plate, director of the Institute of Petrochemical Synthesis imeni A.V. Topchiyev of the USSR Academy of Sciences; Doctor of Chemical Sciences Valeriy Petrovich Shibayev, professor of Moscow State University imeni M.V. Lomonosov; Doctor of Physical Mathematical Sciences Sergey Yakovlevich Frenkel, chief of a department of the Institute of High Molecular Compounds of the USSR Academy of Sciences; Doctor of Physical Mathematical Sciences Irina Nikolayevna Shtennikova, senior scientific associate of the same institute--for the series of works "The Physical Chemistry of Synthetic Liquid Crystal Polymers," which were published during 1968-1983.

8. Academician Grigoriy Alekseyevich Razuvayev, director of the Institute of Chemistry of the USSR Academy of Sciences; Doctor of Chemical Sciences Gleb Arsentyevich Abakumov, deputy director, Candidate of Chemical Sciences Vladimir Kuzmich Cherkasov, senior scientific associate, workers of the same institute; Academician Martin Izrailovich Kabachnik, chief of a laboratory of the Institute of Elementoorganic Compounds imeni A.N. Nesmeyanov of the USSR Academy of Sciences; Doctors of Chemical Sciences Nikolay Nikolayevich Bubnov, Stanislav Panteleymonovich Solodovnikov, and Aleksandr Ivanovich Prokofyev, senior scientific associates of the same institute; Candidate of Chemical Sciences Yevgeniy Semenovich Klimov, senior scientific associate of the Scientific Research Institute of Physical and Organic Chemistry of Rostov State University imeni M.A. Suslov; Doctor of Chemical Sciences Vladimir Vladimirovich Yershov, chief of a laboratory of the Institute of Chemical Physics of the USSR Academy of Sciences--for the series of works "The Synthesis, Structure, Reactivity, and Use of Ortho-Heptaquinone Complexes of Transition and Nontransition Elements," which were published during 1971-1983.

9. Academician of the Kazakh SSR Academy of Sciences Aytmukhamed Abdullayevich Abdulin, director of the Institute of Geological Sciences imeni K.I. Satpayev of the Kazakh SSR Acaedmy of Sciences; Doctors of Geological Mineralogical Sciences Vitaliy Gavrilovich Li and Yevgeniy Ivanovich Patalakha, deputy directors, Academicians of the Kazakh SSR Academy of Sciences Aryktay Kayupovich Kayupov and Grigoriy Nikiforovich Shcherba, chiefs of departments, Candidates of Geological Mineralogical Sciences Georgiy Filippovich Lyapichev and Leonid Aleksandrovich Miroshnichenko, chiefs of laboratories, associates of the same institute; Doctor of Geological Mineralogical Sciences Viktor Vasilyevich Popov, chief of a department of the USSR State Planning Committee; Doctor of Geological Mineralogical Sciences Valeriy Aleksandrovich Narseyev, director of the Central Scientific Research Institute of Geological Prospecting for Nonferrous and Precious Metals; Candidate of Geological Mineralogical Sciences Tokish Akishevich Akishev, general director of the Kazakh Geological Production Association for Geophysical Operations--for the series of works "The Metallogeny of Kazakhstan and Comprehensive Studies of the Most Important Mining Regions," which were published during 1968-1983.

10. Doctor of Medical Sciences Arsen Petrovich Ayriyan, chief physician of the district hospital of the village of Armash of Araratskiy Rayon of the Armenian SSR; Candidate of Medical Sciences Sergey Ivanovich Belov, docent of the Vitebsk Medical Institute; Candidate of Medical Sciences Boris

Vasilyevich Vershinskiy, senior scientific associate of the Leningrad Scientific Research Institute of Epidemiology and Microbiology imeni Pasteur; Candidate of Medical Sciences Artur Arturovich Keller, chief of a department of the Military Medical Academy imeni S.M. Kirov; Candidate of Medical Sciences Nikolay Konstantinovich Sokolov, docent of the same academy; Doctor of Geographical Sciences Boris Borisovich Prokhorov, senior scientific associate of a laboratory for the monitoring of the natural environment and the climate; Candidate of Medical Sciences Yevgeniy Ivanovich Ignatyev, former chief of a sector of the Council for the Study of Productive Forces attached to the USSR State Planning Committee; Candidate of Geographical Sciences Yelena Lvovna Raykh, senior scientific associate of the Institute of Geography of the USSR Academy of Sciences; USSR First Deputy Minister of Health Doctor of Medical Sciences Oleg Prokopyevich Shchepin; Doctor of Geographical Sciences Yefim Solomonovich Feldman, chief of a chair of the Tiraspol State Pedagogical Institute imeni T.G. Shevchenko; Doctors of Medical Sciences Aleksey Alekseyevich Shoshin and Vladimir Yakovlevich Podolyan--for the development of the theory and methods of medical geography and their introduction in the practice of the national economy.

11. Doctor of Biological Sciences Nataliya Fedorovna Avrova, senior scientific associate of the Institute of Evolutionary Physiology and Biochemistry imeni I.M. Sechenov of the USSR Academy of Sciences; Academician Yevgeniy Mikhaylovich Kreps, chief of a laboratory of the same institute; Corresponding Member of the USSR Academy of Sciences Lev Davydovich Bergelson, chief of a laboratory of the Institute of Inorganic Chemistry imeni M.M. Shemyakin of the USSR Academy of Sciences; Doctor of Chemical Sciences Ella Volfovna Dyatlovitskaya, Candidate of Chemical Sciences Yulian Georgiyevich Molotkovskiy, senior scientific associates, workers of the same institute; Doctor of Chemical Sciences Vitaly Ivanovich Shvets, prorector of the Moscow Institute of Fine Chemical Technology imeni M.V. Lomonosov; Corresponding Member of the USSR Academy of Sciences Rima Porfiryevna Yevstigneyeva, chief of a chair, Doctors of Chemical Sciences Yelena Nikolayevna Zvonkova and Galina Andreyevna Serebrennikova, professors, associates of the same institute; Doctor of Pharmaceutical Sciences Georgiy Antonovich Sennikov, director of the Kharkov Enterprise for the Production of Bacterial Compounds; Candidate of Chemical Sciences Yuriy Mikhaylovich Krasnopolskiy, chief of the central plant laboratory of the same enterprise; Doctor of Medical Sciences Georgiy Nikolayevich Khlyabich, chief of an administration of the USSR Ministry of Health--for the series of works "The Structure and Functions of Lipids," which were published during 1965-1983.

12. Academician Natalya Petrovna Bekhtereva, director of the Scientific Research Institute of Experimental Medicine of the USSR Academy of Medical Sciences, director of the work; Doctor of Biological Sciences Valentina Aleksandrovna Ilyukhina, Doctor of Medical Sciences Vladimir Mikhaylovich Smirnov, directors of laboratories, Doctors of Biological Sciences Yuriy Lvovich Gogolitsyn and Yuriy Dmitriyevich Kropotov, Doctor of Medical Sciences Dilyara Kurbanovna Kambarova, Candidate of Medical Sciences Andrey Dmitriyevich Anichkov, senior scientific associates of the same institute; Doctor of Biological Sciences Nina Aleksandrovna Aladzhalova, senior scientific associate of the Institute of Psychology of the USSR Academy of Sciences--for basic research on the physiology of the human brain.

13. Corresponding Members of the USSR Academy of Sciences Vadim Tikhonovich Ivanov and Vladimir Fedorovich Bystrov, deputy directors of the Institute of Bioorganic Chemistry imeni M.M. Shemyakin of the USSR Academy of Sciences; Candidates of Chemical Sciences Viktor Ionovich Tsetlin and Yevgeniy Vasilyevich Grishin, senior scientific associates of the same institute; Corresponding Member of the Uzbek SSR Academy of Sciences Bekdzhan Aybekovich Tashmukhamedov, chief of a department of the Institute of Biochemistry of the Uzbek SSR Academy of Sciences; Acaedmician of the Ukrainian SSR Academy of Sciences Valeriy Kazimirovich Lishko, director of the Institute of Biochemistry imeni A.V. Palladin of the Ukrainian SSR Academy of Sciences; Doctor of Biological Sciences Galina Nikolayevna Mozhayeva, chief of a sector of the Institute of Cytology of the USSR Academy of Sciences; Doctor of Medical Sciences Boris Izrailevich Khudyy-Khodorov, director of a laboratory of the Institute of Surgery imeni A.V. Vishnevskiy of the USSR Academy of Medical Sciences--for the series of works "Neurotoxins as Tools of the Study of the Molecular Mechanisms of the Generation of a Nerve Pulse," which were published during 1973-1983.

14. Corresponding Member of the USSR Academy of Sciences Sergey Ivanovich Kuznetsov, chief of a department of the Institute of Microbiology of the USSR Academy of Sciences--for the series of works "The Microflora of Lakes and Its Geochemical Activity," which were published during 1970-1981.

15. Doctor of Biological Sciences Leonid Fedorovich Pravdin, professor-consultant of the All-Union Scientific Production Association for Tree Seed Growing and the Strain Testing of Tree Species--for a series of works on tree genetics, breeding, and seed growing, which were published during 1964-1975.

16. Doctor of Historical Sciences Leonid Romanovich Kyzlasov, professor of Moscow State University imeni M.V. Lomonosov--for the series of works "The History and Archeology of Southern Siberia and Central Asia," which were published during 1960-1980.

17. Doctor of Technical Sciences Prokopiy Kirillovich Teterin, senior scientific associate of the Central Scientific Research Institute of Ferrous Metallurgy imeni I.P. Bardin--for the monographs "Teoriya periodicheskoy prokatki" [The Theory of Periodic Rolling] and "Teoriya poperechnoy i vintovoy prokatki" [The Theory of Cross and Screw Rolling], which were published respectively in 1978 and 1983.

II. In Technology

1. Candidate of Geological Mineralogical Sciences Vladimir Petrovich Vasilenko, deputy chief of an administration of the RSFSR Ministry of Geology; Candidate of Geological Mineralogical Sciences Nikolay Ivanovich Lavrik, former general director of the Primorskiy Geological Production Association; Ivan Leontyevich Kupriyenko and Vladimir Mikhaylovich Raspopov, chiefs of divisions, Igor Nikolayevich Darovskikh, deputy chief of a division, Candidate of Geological Mineralogical Sciences Vladimir Semenovich Rynkov, chief hydrogeologist of the expedition, Mikhail Vasilyevich Petaychuk, senior hydrogeologist of a division of the expedition, Ivan Fedorovich Skripko, chief of a party, Aleksandr Stanislavovich Voznyakovskiy, chief hydrogeologist of a

party, Grigoriy Grigoryevich Polyakov, drilling foreman, Anatoliy Zakharovich Motin, driller, workers of the same association; Candidate of Geological Mineralogical Sciences Nikolay Nikolayevich Sharapanov, chief of a party of the combined hydrogeological expedition of the All-Union Scientific Research Institute of Hydrogeology and Engineering Geology--for the discovery and effective prospecting of large deposits of ground waters for the city of Vladivostok and other population centers of the southern part of Maritime Kray.

2. Nikolay Nikolayevich Golubev, chief geologist of a party of the Karelian Combined Geological Prospecting Expedition; Vitaliy Vasilyevich Morozov, senior geologist of a division, Anatoliy Nikolayevich Yegorushkov, senior geologist of a party, Vasiliy Ivanovich Makarin, rig builder, workers of the same expedition; Yevgeniy Ivanovich Moshkov, chief geologist of a party of the Murmansk Geological Prospecting Expedition; Nikolay Nikolayevich Khrustalev, general director of the Northwestern Geological Production Association; Yevgeniy Lyudvigovich Tushevskiy, chief of a division of the same association; Zoya Aleksandrovna Makarova, former senior scientific associate of the All-Union Scientific Research Institute of Geology imeni A.P. Karpinskiy; Candidate of Technical Sciences Nataliya Andreyevna Patkovskaya, senior scientific associate of the All-Union Scientific Research and Planning Institute of the Mechanical Processing of Minerals; Kirill Davydovich Belyayev, former chief of the Northwestern Territorial Geological Administration; Petr Ivanovich Ivanov, technician-geological prospector; Corresponding Member of the USSR Academy of Sciences Kauko Ottovich Kratts--for the discovery and prospecting of the Kostomuksha Iron Ore Deposit in the Karelian ASSR.

3. Dmitriy Semenovich Voronin, deputy chief power engineer of the Magnitogorsk Metallurgical Combine imeni V.I. Lenin; Rudolf Mikaylovich Gryzlin, chief power engineer of the Novolipetsk Metallurgical Combine imeni Yu.V. Andropov; Candidate of Technical Sciences Aleksey Ivanovich Tolochko, director of the All-Union Scientific Research and Planning Institute for the Purification of Industrial Gases and Waste Waters and the Use of Secondary Energy Resources of Ferrous Metallurgy; Candidate of Technical Sciences Vladimir Avraamovich Kholodnyy, deputy director, Candidate of Technical Sciences Garri Semenovich Pantelyat, chief of a laboratory, Candidate of Technical Sciences Aleksandr Vasilyevich Yerokhin, chief engineer, Vladimir Onufriyevich Shevchuk, deputy chief engineer, workers of the same institute; Candidate of Technical Science Viktor Georgiyevich Ponomarev, director of a laboratory of the All-Union Scientific Research Institute of Water Supply, Sewerage, Hydrotechnical Structure, and Engineering Hydrogeology; Candidate of Technical Sciences Petr Ivanovich Plotnikov, former deputy chief of a division of the All-Union Industrial Association of Metallurgical Enterprises--for the development and introduction of closed circulating water supply systems of enterprises of ferrous metallurgy.

4. Anatoliy Ivanovich Bibikov, chief process engineer of the Dnepropetrovsk Combine Plant imeni K.Ye. Voroshilov; Aleksandr Borisovich Krasko, deputy director, Aleksandr Nikolayevich Ushakov, chief of a division, Aleksandr Nikolayevich Zhernovyy, chief of a group, Biktor Petrovich Krasnoshchek and Afanasiy Petrovich Malik, chiefs of bureaus, workers of the same plant; Petr

Sergeyevich Volkov, chief of a department of a main administration of the USSR State Committee for the Supply of Production Equipment for Agriculture; Candidate of Technical Sciences Aleksandr Tikhonovich Korobeynikov, director of the Kuban Scientific Research Institute for the Testing of Tractors and Agricultural Machinery; Ivan Stepanovich Reztsov, chief mechanic of a department of a main administration of the USSR Ministry of Agriculture; Candidate of Technical Sciences Valeriy Anatolyevich Shabranskiy, chief of a department of the All-Union Scientific Research Institute for the Testing of Machinery and Equipment of Animal Husbandry and Fodder Production--for the development and introduction in agricultural production of the SPS-4,2 high-performance self-propelled beet loader-cleaner.

5. Gennadiy Mikhaylovich Barinov, chief of a sector of a scientific research institute; Yevgeniy Dmitriyevich Savkov, director, Candidate of Technical Sciences Aleksandr Naumovich Geberg, chief of a department, associates of the same institute; USSR Deputy Minister of Health Academician of the USSR Academy of Medical Sciences Yuriy Fedorovich Isakov; Candidate of Physical Mathematical Sciences Anatoliy Aleksandrovich Kuznetsov, chief of a laboratory of the Institute of Chemical Physics of the USSR Academy of Sciences; Corresponding Member of the USSR Academy of Medical Sciences Vladimir Dmitriyevich Fedorov, director of the Scientific Research Institute of Proctology; Doctor of Medical Sciences Tamara Semenovna Odaryuk, chief of a department of the same institute; Doctor of Medical Sciences Vladimir Innokentyevich Rykov, docent of the Central Institute of the Advanced Training of Physicians; Doctor of Medical Sciences Eduard Aleksandrovich Stepanov, professor of the Second Moscow Medical Institute imeni N.I. Pirogov; Doctor of Medical Sciences Aleksandr Mikhaylovich Shabanov, chief of a chair of the Kalinin Medical Institute; Doctor of Medical Sciences Nikolay Ivanovich Kondrashin, director of the Central Scientific Research Institute of Prosthetics and Prosthetic Design; Doctor of Medical Sciences Vyacheslav Ivanovich Geraskin--for the development and introduction in clinical practice of new methods of performing operations with the use of magnetomechanical systems in case of diseases of the gastrointestinal tract and deformities of the thorax.

6. Doctor of Medical Sciences Nataliya Veniaminovna Kaverina, director of a department of the Scientific Research Institute of Pharmacology of the USSR Academy of Medical Sciences; Candidate of Chemical Sciences Anna Nikitichna Gritsenko, Candidates of Medical Sciences Zlata Petrovna Senova and Valentin Viktorovich Lyskovtsev, senior scientific associates of the same institute; Doctor of Biological Sciences Leonid Valentinovich Rozenshtraukh, director of a laboratory of the All-Union Cardiological Scientific Center of the USSR Academy of Medical Sciences; Doctor of Medical Sciences Aleksandr Sergeyevich Smetnev, director of a department, Candidate of Biological Sciences Yevgeniy Pavlovich Anyukhovskiy, senior scientific associate, workers of the same scientific center; Ilmar Khariyevich Penke, general director of the Olayne Chemical and Pharmaceutical Production Association; Valeriy Nikolayevich Chikharev, chief engineer of a main administration attached to the USSR Ministry of Health; Doctor of Chemical Sciences Semen Vladimirovich Zhuravlev--for the development and introduction in medical practical of a new group of highly effective medicinal compounds for the prevent and treatment of disturbances of the heart rhythm.

7. Academician of the USSR Academy of Medical Sciences Aleksandr Nikolayevich Konovalov, director of the Institute of Neurosurgery imeni Academician N.N. Burdenko of the USSR Academy of Medical Sciences; Doctor of Medical Sciences Yuriy Mikhaylovich Filatov, director of a department of the same institute; Doctor of Medical Sciences Vitaliy Aleksandrovich Khilko, chief of a chair of the Military Medical Academy imeni S.M. Kirov; Doctor of Medical Sciences Boris Aleksandrovich Samotokin, professor-consultant of the same academy; Doctor of Medical Sciences Eduard Izrailovich Kandel, director of a department of the Institute of Neurology of the USSR Academy of Medical Sciences; Doctor of Medical Sciences Efraim Isaakovich Zlotnik, director of a department of the Belorussian Scientific Research Institute of Neurology, Neurosurgery, and Physiotherapy; Doctor of Medical Sciences Boris Mikhaylovich Nikiforov, professor of the Leningrad Pediatric Medical Institute; Doctor of Medical Sciences Raymond Petrovich Kikut, professor of the Riga Medical Institute--for the development and introduction in practice of methods of the surgical treatment of aneurisms of vessels of the brain.

8. Academician of the USSR Academy of Medical Sciences Mikhail Ilich Kuzin, director of the Institute of Surgery imeni A.V. Vishnevskiy of the USSR Academy of Medical Sciences, supervisor of the work; Doctor of Medical Sciences Vladimir Konstantinovich Sologub, deputy director, Doctor of Medical Sciences Boris Mikhaylovich Kostyuchenk, director of a department, Candidates of Medical Sciences Aleksey Mikhaylovich Svetukhin and Valeriy Mikhaylovich Matasov, senior scientific associates, Candidate of Medical Sciences Tofik Mamed ogly Gasanov, junior scientific associate, workers of the same institute; Grigoriy Semenovich Antonenko, general director of the Odessa Production Association of Refrigeration Machine Building; Vladimir Grigoryevich Tikhiy, chief of a special design and technological bureau, Mark Eleazarovich Lemberg, chief project designer, Vyacheslav Pavlovich Tsaplev, leader of a brigade of fitters, workers of the same association; Yuriy Dmitriyevich Lyubimchenko, deputy chief of a division of a scientific production association--for the development and introduction in clinical practice of methods and equipment for the treatment of wounds and burns in an abacterial regulated air environment.

9. Doctors of Medical Sciences Zoya Sergeyevna Mironova and Aleksey Fedorovich Kaptelin, scientific consultants of the Central Scientific Research Institute of Traumatology and Orthopedics imeni N.N. Priorov; Candidate of Medical Sciences Ivan Averyanovich Vadnin, director of a department of the same institute; Doctor of Medical Sciences Arkadiy Filippovich Leshchinskiy, director of a laboratory of the Odessa Scientific Research Institute of Health Resort Studies; Doctor of Medical Sciences Anatoliy Aleksandrovich Kravchenko, director of a group of the same institute; Academician of the Ukrainian SSR Academy of Sciences Konstantin Sergeyevich Ternovyy, chief of the Fourth Main Administration attached to the Ukrainian SSR Ministry of Health; Doctor of Medical Sciences Georgiy Stepanovich Yumashev, chief of a chair of the First Moscow Medical Institute imeni I.M. Sechenov--for the development and introduction in clinical practice of methods of restorative treatment in case of injuries and diseases of the osteal-articular system.

10. Doctor of Medical Sciences Aleksandr Ilich Paches, director of a department of the All-Union Oncological Scientific Center of the USSR Academy

of Medical Sciences; Doctor of Medical Sciences Viktor Valentinovich Shental, Candidate of Medical Sciences Andrey Vladimirovich Mikhaylovskiy, senior scientific associates of the same scientific center; Candidate of Physical Mathematical Sciences Tamara Petrovna Ptukha, chief of a laboratory of the All-Union Scientific Research and Testing Institute of Medical Technology; Gennadiy Ivanovich Zheltov, deputy general director of a scientific production association; Academician of the Ukrainian SSR Academy of Sciences Aleksandr Alekseyevich Shalimov, director of the Kiev Scientific Research Institute of Clinical and Experimental Surgery; Yuriy Nikolayevich Muskin, chief of a laboratory of a scientific research institute; Doctor of Medical Sciences Vladimir Sergeyevich Zemskiy, chief of a chair of the Kiev Medical Institute imeni Academician A.A. Bogomolets; Doctor of Medical Sciences Andrzej Kulakowski, deputy director of the M. Sklodowska-Curie Institute of Oncology (Warsaw, Poland); Wieslaw Rurzicki-Gerlach, physician-surgeon of the same institute; Wlodzimierz Szmulo, chief of a department of the Scientific Research Center for Medical Technology (Wasraw, Poland); Academician Aleksandr Iosifovich Shalnikov, senior scientific associate of the Institute of Physical Problems imeni S.I. Vavilov of the USSR Academy of Sciences--for the development and introduction in clinical practice of methods and equipment for the cryodestruction of malignant neoplasms.

11. Candidate of Technical Sciences Yuriy Ivanovich Bayborodov, docent of the Kuybyshev Aviation Institute imeni Academician S.P. Korolev, supervisor of the work; Igor Borisovich Pokrovskiy, senior engineer, Anatoliy Nikolayevich Yezhov, lathe operator, workers of the same institute; Vitaliy Ivanovich Gorin, chief of a main administration of the USSR Ministry of Power and Electrification; Aleksey Aleksandrovich Romanov, director of the Volga Hydroelectric Power Plant imeni V.I. Lenin; Sergey Vasilyevich Rakovskiy, deputy chief engineer of the same hydroelectric power plant; Yuriy Alekseyevich Manenkov, chief engineer of the Cheborsary Energozapchast Electrical Machinery Plant of Spare Parts; Vladimir Alekseyevich Morskov, chief designer of the same plant; Anatoliy Yevgenyevich Aleksandrov, deputy chief of a shop of the Soyuztekhenergo Production Association for the Adjustment and Improvement of the Technology and Operation of Electric Power Plants and Networks; Vladimir Pavlovich Loshkarev, chief designer of the Uralelektrotyazhmash Production Association imeni V.I. Lenin; Ivan Fedorovich Ustinov, director of the Bratsk Hydroelectric Power Plant imeni 50-letiya Velikogo Oktyabrya; Doctor of Technical Sciences David Shmulevich Kodnir--for the development of highly stressed elastic metal-base laminate plane supports and their introduction at the hydraulic turbogenerator units of the largest hydroelectric power plants.

12. Vladimir Ivanovich Blau, chief engineer of the Vitebsk Machine Tool Building Plant imeni Comintern; Yuriy Yavkovlevich Sidorenkov, chief designer, Viktor Dmitriyevich Balalayev, fitter, workers of the same plant; Candidate of Technical Sciences Nikolay Konstantinovich Startsev, chief of a division of the Vitebsk Special Design Bureau of Gear-Machining, Grinding, and Tool-Grinding Machines; Stanislav Petrovich Ryk, chief designer, Moisey Maksimovich Shteyman, chief project designer, Mikhail Isakovich Nanos, chief of a sector, workers of the same design bureau; Gennadiy Petrovich Titov, chief of the design bureau of the Yegoryevsk Komsomolets Machine Tool Building Plant; Yuriy Nikolayevich Korotov, leader of a brigade of fitters of the same

plant; Vladimir Klementyevich Yurchenko, deputy chief of a shop of the Minskiy traktornyy zavod imeni V.I. Lenina Production Association; Aleksey Kondratyevich Demyanovich, adjuster of the same association; Aleksandr Vasilyevich Stepanov, chief process engineer of the Smolensk Plant of Motor Vehicle Assemblies--for the development and introduction in industry of highly productive automatic machines, automatic lines, and automated complexes for the mass production of gears.

13. Yuriy Anatolyevich Yermakov, chief designer of machine tool building of the Gorkiy Motor Vehicle Works (the GAZ Production Association); Nikolay Andreyevich Pugin, general director, Leonid Bronislavovich Nechiperovich, deputy chief designer of machine tool building, Anatoliy Sergeyevich Polyakov, chief production engineer, Mikhail Pavlovich Zuyev, deputy chief production engineer, Yefim Ruvimovich Parkman, deputy director, Anatoliy Grigoryevich Parkhomenko, chief of a shop, Vladimir Mikhaylovich Churayev, production manager, Yelisey Mikhaylovich Sidorin and Mikhail Konstantinovich Tarin, leaders of brigades of fitters, Konstantin Konstantinovich Chichagov, former deputy chief of a division, workers of the same plant--for the development and introduction in production of general-purpose automatic molding lines for the production of castings.

14. Boris Moiseyevich Prudovskiy, chief of the Moscow Sector of the Leningrad Scientific Research and Design Institute of Chemical Machine Building, supervisor of the work; Candidate of Technical Sciences Boris Ivanovich Olerinskiy, deputy director, Candidate of Technical Sciences Aleksandr Petrovich Pozdnyakov, chief of a laboratory, German Alekseyevich Arkhipov, deputy chief of a department, associates of the same institute; Jan Jelen, chief designer of the Buzuluk Plant (Komarov, CSSR); Jaroslav Jecman, leader of a brigade of fitters of the same plant; Mikahil Sergeyevich Beloded, deputy general director of the Ural Production Association of Chemical Machine Building imeni 50-letiya SSSR; Konstantin Ivanovich Dudka, chief process engineer, Anatoliy Ivanovich Sukhanov, boiler maker-assembler, workers of the same association; Valentin Vasilyevich Sazykin, chief of the All-Union Industrial Association for the Production of Synthetic Rubber; Aleksandr Izosimovich Nazarov, deputy chief engineer of the Yefremov Plant of Synthetic Rubber imeni S.V. Lebedev; Nazip Ikhsanovich Khismatullin, chief mechanic of the Nizhnekamsk Nizhnekamskneftekhim Production Association--for the development and industrial introduction of automated lines for the obtaining of synthetic rubbers with a productivity of 1 ton per hour, 4 tons per hour, and 8 tons per hour.

15. Vladimir Mikhaylovich Kolotnev, chief of the Murmansk Commercial Seaport; Garri Tsaliyevich Gerasun, chief of the pneumatic transport plant, Anatoliy Dmitriyevich Abramov, group electrical engineer of the same plant, Sergey Ivanovich Vdovin and Vasiliy Fedorovich Kopalin, docker-machine operators 1st class, workers of the same port; Gennadiy Anufriyevich Klimas, chief of a department of the Leningrad Affiliate of the State Planning, Surveying, and Scientific Research Institute of Maritime Transport; Fayvel Itskovich Rozenker, chief project engineer of the same affiliate; First Deputy Minister of the Maritime Fleet Vladimir Ivanovich Tikhonov; Valentin Iosifovich Kulikov, chief of a main administration of the Ministry of Transport Construction; Yuriy Maksimovich Vrodlitsev, chief of a subdivision of the

Dnepropetrovsk Railroad Car Building Plant imeni gazety PRAVDA; Gennadiy Grigoryevich Terentyev, electrician of the Severnyy Sevmormontazh Installation Administration--for the development and introduction at the Murmansk Port of a technological automated complex for the transshipment of apatite.

16. Doctor of Chemical Sciences Mikhail Aleksandrovich Grachev, chief of a laboratory of the Novosibirsk Institute of Bioorganic Chemistry of the Siberian Department of the USSR Academy of Sciences, supervisor of the work; Vladimir Arkadyevich Livanov, deputy director, Candidate of Physical Mathematical Sciences Mikhail Petrovich Perelroyzen, Grigoriy Iosifovich Baram, junior scientific associates, workers of the same institute; Yuriy Andreyevich Bolvanov, chief of a sector of the special design and technological bureau of special electronics and analytical instrument making of the Siberian Department of the USSR Academy of Sciences; Sergey Vladimirovich Kuzmin, chief design engineer of the same design bureau; Viktor Viktorovich Kargaltsev, senior engineer of the Institute of Nuclear Physics of the Siberian Department of the USSR Academy of Sciences; Candidate of Technical Sciences Eduard Adolfovich Kuper, senior scientific associate of the same institute; Candidate of Economic Sciences Yuriy Mikhaylovich Kiselev, director of a pilot plant of the Siberian Department of the USSR Academy of Sciences; Corresponding Member of the USSR Academy of Sciences Lev Stepanovich Sandakhchiyev, director of the All-Union Scientific Research Institute of Molecular Biology; Oleg Nikolayevich Safronov, chief of a divisions of the Orel Nauchpribor Production Association--for the development of a method of microcolumn liquid chromatography, the development and organization of the production of the Ob-4 (Milikhrom) microcolumn liquid chromatographs.

17. Viktor Nikolayevich Gusev, leader of a brigade of installers of radio equipment of the Rostov Gorizont Production Association; Viktor Aleksandrovich Spiridonov, general director, Candidate of Technical Sciences Anatoliy Andreyevich Koshevoy, chief designer, Yevgeniy Borisovich Georgizon, chief designer, Candidate of Technical Sciences Yakov Gershevich Ostromukhov, chief of a division, Candidate of Technical Sciences Yevgeniy Yakovlevich Rudenko, chief of a sector, workers of the same association; Doctor of Technical Sciences Nikolay Aleksandrovich Kuznetsov, deputy director of the Institute of Control Problems (Automation and Remote Control); Boris Vasilyevich Timofeyev, chief engineer of an administration of a ministry; Petr Grigoryevich Usachev, captain-instructor of the Novorossiysk Maritime Shipping Company; Leonid Leonidovich Khlebnikov, captain of the Ilichevsk Commercial Seaport; Candidate of Technical Sciences Roman Nikolayevich Chernyayev, deputy director of the Central Scientific Research Institute of the Maritime Fleet; Candidate of Technical Sciences Andrey Andreyevich Yakushenkov, chief of a department of the same institute--for the development and introduction in the maritime fleet of systems of the automation of navigation.

18. Valentin Yevgenyevich Kuznetsov, chief of the design bureau of the Sever EVM kompleks Production Association; Irina Yevgenyevna Shklyarova, chief of a bureau of the same association; Doctor of Chemical Sciences Vladimir Yevgenyevich Kazarinov, director of the Institute of Electrochemistry imeni A.N. Frumkin of the USSR Academy of Sciences; Candidate of Chemical Sciences

Mikhail Yakovlevich Kats, chief of a sector of the same institute; Candidate of Physical Mathematical Sciences Aleksandr Anatolyevich Aleksandrov, chief of a laboratory of the Institute of Molecular Genetics of the USSR Academy of Sciences; Boris Petrovich Butrin, former deputy director of the All-Union Scientific Research and Design Institute of Numerical Control Systems; Sergey Frolovich Khrapchenko, chief of the All-Union Industrial Association for the Production of Calculators and Means of Program Control; Vasiliy Ivanovich Shuteyev, director of the Kursk Schetmash Plant; Fedor Antonovich Bubalo, chief of a shop of the same plant; Sergey Nikolayevich Abramovich, chief of a sector of the Leningrad Burevestnik Scientific Production Association; Viktor Abramovich Shakhverdov, chief specialist of the Main Computer Center of the USSR State Planning Committee; Yuriy Nikolayevich Seregin, chief of a subdivision of the same computer center--for the development and introduction in the national economy of a family of problem-oriented computer complexes based on the Iskra-226 minicomputer.

19. Vladimir Mikhaylovich Abramov, deputy chief of an administration of the Ministry of Power Machine Building; Candidate of Physical Mathematical Sciences Boris Vasilyevich Budylin, chief engineer of a main administration of the USSR State Committee for the Utilization of Atomic Energy; Remir Nikiforovich Govorushkin, engineer of the same administration; Leonid Vladimirovich Gurevich, chief project engineer of the Ural Department of the All-Union State Scientific Research, Planning, and Surveying Institute for the Planning of Nuclear Electric Power Plants and Large Fuel and Power Complexes; Candidate of Physical Mathematical Sciences Valentin Nikolayevich Sharapov, chief of a laboratory of the Physics and Power Engineering Institute; Valentin Dmitriyevich Petrov, senior scientific associate of the same institute; Mikhail Fedorovich Nazarov, deputy chief of a shop of the Izhorskiy zavod Production Association imeni A.A. Zhdanov; Yuriy Abramovich Nozhikov, chief of the Bratskgesstroy Special Construction Administration; Candidate of Technical Sciences German Yefimovich Soldatov, deputy chief engineer of the All-Union Industrial Association for Atomic Energy; Aleksandr Nikolayevich Danilov, leader of a brigade of fitters of the Bilibino Nuclear Electric Power Plant imeni gazety KOMSOMOLSKAYA PRAVDA--for the building of the Bilibino Nuclear Heat and Electric Power Plant.

20. Doctor of Technical Sciences Yuriy Nikolayevich Vershinin, director of the State Scientific Research Power Engineering Institute imeni G.M. Krzhizhanovskiy; Candidate of Technical Sciences Lev Yevgenyevich Vrublevskiy, chief project engineer of the Energotekhprom Pilot Production Engineering Enterprise; Candidate of Technical Sciences Aleksey Andreyevich Zhavoronkov, chief of a division of the same enterprise; Academician of the Azerbaijan SSR Academy of Sciences Chingiz Mekhtiyevich Dzhuvarly, director of a laboratory of the Institute of Physics of the Azerbaijan SSR Academy of Sciences; Candidate of Technical Sciences Yevgeniy Vasilyevich Dmitriyev, senior scientific associate of the same institute; Candidates of Technical Sciences Mikhail Stanislavovich Dobzhinskiy and Ruslan Vladimirovich Manchuk, chiefs of sectors of the Siberian Scientific Research Institute of Power Engineering; Candidate of Technical Sciences Leonid Nikolayevich Repyakh, senior scientific associate of the same institute; Candidate of Technical Sciences Igor Lvovich Shleyfman, chief of a laboratory of the scientific research center for the testing of high-voltage equipment--for the development

and organization of the industrial production of betel resistors for the protection of the Unified Electric Power System of the country against short circuit currents.

21. Stanislav Sergeyevich Glazov, Doctor of Physical Mathematical Sciences Nikolay Aleksandrovich Savich, Candidates of Technical Sciences Aleksandr Leonidovich Zaytsev and Stanislav Sergeyevich Matyugov, senior scientific associates of the Institute of Radio Engineering and Electronics of the USSR Academy of Sciences; Doctor of Technical Sciences Oleg Izosimovich Yakovlev, chief of a laboratory of the same institute; Doctor of Physical Mathematical Sciences Gor Semenovich Ivanov-Kholodnyy, chief of a laboratory of the Institute of Applied Geophysics imeni Academician Ye.K. Fedorov; Doctors of Physical Mathematical Sciences Viktor Valentinovich Kerzhanovich and Vladimir Anatolyevich Krasnopolskiy, Candidate of Physical Mathematical Sciences Zinaida Petrovna Cheremukhina, senior scientific associates of the Institute of Space Research of the USSR Academy of Sciences; Doctor of Physical Mathematical Sciences Vasiliy Ivanovich Moroz, chief of a department, Doctor of Physical Mathematical Sciences Lev Mikhayolovich Mukhin, chief of a laboratory, workers of the same institute--for the study of the atmosphere and ionosphere of Venus by means of descent vehicles and satellites of the planet.

22. Candidate of Technical Sciences Viktor Lvovich Aronovich, deputy director of the Almalyk Mining and Metallurgical Combine imeni V.I. Lenin; Candidate of Geological Mineralogical Sciences Vladimir Yusufovich Dedy, chief geologist, Usman Mirakhmedovich Nasyrov, chief of a mine, Aleksandr Ivanovich Shilov, chief of a party, workers of the same combine; Vladimir Alekseyevich Maksimov, chief of an administration of the USSR Ministry of Nonferrous Metallurgy; Boris Filippovich Suslikov, deputy chief of an administration, Candidate of Technical Sciences Gennadiy Gavrilovich Kozlov, chief of a party of the Central Complex Geological Expedition, workers of the same ministry; Candidate of Technical Sciences Vasiliy Yakovlevich Nagornyy, senior scientific associate of the All-Union Scientific Research Institute of Radiation Technology; Stanislav Aleksandrovich Ponomarev, chief of a department of the same institute; Leonid Fedorovich Ponomarev, director of the Zyryanovsk Lead Combine imeni 60-letiya SSSR; Candidate of Technical Sciences Yuriy Valeryanovich Reutskiy, deputy chief engineer of the same combine; Doctor of Technical Sciences Boris Pavlovich Bulatov--for the development of radioactive isotope devices for the automatic determination of the content of nonferrous metals in moving containers, the grading and control of the quality of ore.

23. Doctor of Chemical Sciences Roman Aleksandrovich Veselovskiy, chief of a department of the Institute of Chemistry of High Molecular Compounds of the Ukrainian SSR Academy of Sciences; Candidate of Technical Sciences Yevgeniy Ivanovich Fedorchenko, senior scientific associate, Nikolay Dmitriyevich Trifonov, director of the pilot works, Zhorzh Ivanovich Shanayev, diver 1st class, associates of the same institute; Candidate of Technical Sciences Valeriy Davydovich Chernyayev, chief of a main administration of the Ministry of the Petroleum Industry; Konstantin Alekseyevich Zabela, chief, Candidate of Technical Sciences Yuriy Konstantinovich Znachkov, chief of a group, workers of an expeditionary detachment of underwater engineering operations of the same ministry; Anatoliy Nikolayevich Shilakin, chief of a division of the

All-Union Association for Shipbuilding, the Maintenance and Repair of the Fleet--for the development and introduction of the technology of the reconditioning of petroleum tanks, underwater pipelines, and hulls of ships on the basis of the use of special polymer cements.

24. Candidate of Technical Sciences Anatoliy Grigoryevich Laptev, director of the Donetsk State Planning, Design, and Experimental Institute of the Complete Mechanization of Mines; Vladimir Abramovich Lipkovich, chief project designer, Iosif Isayevich Tamarin, former chief project designer, Ilya Vasilyevich, manager of the brigade, associates of the same institute; Vasiliy Terentyevich Gershun, fitter of the Gorlovka Machine Building Plant imeni S.M. Kirov; Aleksandr Andreyevich Chichkan, chief of the All-Union Industrial Association of Coal Machine Building; Candidate of Technical Sciences Yevgeniy Petrovich Zakharov, deputy chief of an administration of the Ukrainian SSR Ministry of the Coal Industry; Valeriy Dmitriyevich Kalmykov, leader of a brigade of machine operators of the Mine imeni K.A. Rumyantsev of the Artemovo Production Association for Coal Mining; Valeriy Mikhaylovich Pichkovskiy, director of the Mine imeni V.I. Lenin of the same association; Vladimir Ivanovich Selennyy, chief of the Lvov-Volyn Geological Prospecting Expedition; Vladimir Ignatyevich Rovitskiy, chief of a party of the same expedition--for the development, the assimilation of the series production, and the introduction of the highly productive Strela-68 and Strela-77 machines for the driving of rise entries.

25. Corresponding Member of the Ukrainian SSR Academy of Sciences Vladimir Mikhaylovich Kudinov, deputy chairman of the USSR State Committee for Science and Technology, supervisor of the work; Ilya Moiseyevich Aranovskiy, deputy chief of the All-Union Association of the Aluminum Industry; Vadim Sergeyevich Smirnov, deputy director of the All-Union Scientific Research and Planning Institute of the Aluminum, Magnesium, and Electrode Industry; Candidate of Chemical Sciences Vladimir Ivanovich Artemyev, senior scientific associate of the same institute; Vasiliy Nikolayevich Glukhoviskiy, chief mechanic of the Nikolayevskiy Alumina Plant imeni XXVI syezda KPSS; Anatoliy Danilovich Kapitanov, chief welder of the same plant; Corresponding Member of the Ukrainian SSR Academy of Sciences Vladimir Ivanovich Trufyakov, Doctor of Technical Sciences Vladimir Georgiyevich Petushkov, chiefs of departments of the Institute of Electric Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences; Candidate of Technical Sciences Aleksandr Nikolayevich Pashchin, chief of a sector of the same institute; Petr Yermilovich Abaturov, deputy chief engineer of the Pavlodar Aluminum Plant imeni 50-letiya SSSR; Yevgeniy Nikolayevich Dmitriyev, chief mechanic of the same plant--for the development and introduction of a new technology of the explosion machining of welded joints of large equipment and metal components.

26. Candidate of Technical Sciences Serafim Nikolayevich Suturin, deputy chief of the All-Union Association of the Lead, Zinc, and Tin Industry, supervisor of the work; Yuriy Semenovich Arzamastsev, chief of a group of the Central Scientific Research Institute of the Tin Industry; Candidate of Technical Sciences Anatoliy Vladimirovich Dolgon, senior scientific associate of the Institute of Hydrodynamics imeni M.A. Lavrentyev of the Siberian Department of the USSR Academy of Sciences; Candidate of Technical Sciences Ivan Mikhaylovich Selivanov, director of the Novosibirsk Tin Combine; Yuriy

Stepanovich Koryukov and Georgiy Innokentyevich Stepanov, chiefs of shops, Nikolay Georgiyevich Sizykh, chief of a division, Candidate of Technical Sciences Vitaliy Yevgenyevich Dyakov, chief of a department of a shop, Aleksey Alekseyevich Klevakin, foreman, workers of the same combine; Candidate of Technical Sciences Vladimir Sergeyevich Yesyutin, chief of a laboratory of the Institute of Metallurgy and Ore Dressing of the Kazakh SSR Academy of Sciences; Candidate of Economic Sciences Gennadiy Ivanovich Orlov, chief of a special planning, design, and technological bureau of the Sibelektroterm Production Association; Candidate of Technical Sciences Aleksandr Yefimovich Semenov, deputy director of the State Scientific Research, Planning, and Design Institute of Hydrometallurgy of Nonferrous Metals--for the development and introduction of the equipment and technology of the complete processing of stanniferous raw materials.

27. Kazakh SSR Minister of Nonferrous Metallurgy Candidate of Technical Sciences Sauk Temirbayevich Takezhanov, supervisor of the work; Bulat Murzagaliyevich Alibayev, deputy chief of an administration of the same ministry; Akhat Salemkhatovich Kulenov, director of the Ust-Kamenogorsk Lead and Zinc Combine imeni V.I. Lenin; Vildan Anurovich Nasyrov, chief of a shop, Tursungaliy Shakirovich Bayanzhanov, deputy chief of a shop, Nikolay Pavlovich Tolstoukhov, foreman, workers of the same combine; Doctor of Technical Sciences Georgiy Petrovich Giganov, chief of a laboratory of the State Scientific Research Institute of Nonferrous Metals; Doctor of Chemical Sciences Anatoliy Ivanovich Kholkin, director of the Institute of Chemistry and Chemical Technology of the Siberian Department of the USSR Academy of Sciences; Candidate of Technical Sciences Gennadiy Leonidovich Pashkov, deputy director of the same institute; Doctor of Chemical Sciences Valeriy Vladimirovich Sergiyevskiy, chief of a department of the State Scientific Research and Planning Institute of the Chlorine Industry; Corresponding Member of the USSR Academy of Sciences Gennadiy Alekseyevich Yagodin, chief of a chair of the Moscow Chemical Technology Institute imeni D.I. Mendeleyev--for the development and introduction of extraction processes, which ensure the increase of the completeness of the use of polymetallic raw materials, and the establishment at the Ust-Kamenogorsk Lead and Zinc Combine imeni V.I. Lenin of the production of rare metals.

28. Deputy Minister of Construction of Petroleum and Gas Industry Enterprises Sergey Karapetovich Arakelyan; Anatoliy Yakovlevich Yermolin, chief engineer of the All-Union Construction Association for the Building of Underwater River Pipeline Crossings; Vladimir Georgiyevich Pelipenko, chief engineer of an administration of the Vostokpodvodtruboprovodstroy Trust, Stanislav Ivanovich Stanevich, chief of a section of the Surgutpodvodtruboprovodstroy Trust, workers of the same association; Nikolay Nikolayevich Zheludkov, chief specialist of the State Scientific Research, Planning, and Design Institute of the Gas Industry in Southern Regions [YuzhNIIgiprogaz]; Candidate of Technical Sciences Mikhail Alekseyevich Kamyshev, chief of a department of the All-Union Scientific Research Institute for the Construction of Main Pipelines; Yuriy Turekhanovich Kenegesov, chief of a division of the Glavvostoktransgaz Main Territorial Administration for the Transportation and Delivery of Gas; Deputy Minister of the Gas Industry Anatoliy Nikitovich Kolotilin; Aleksandr Mikhaylovich Sushkin, chief designer of the Gazstroymashina Special Design Bureau; Yuriy Afanasyevich Goryainov, deputy

chief of the All-Union Industrial Association for Gas Production in Tyumen Oblast; Aleksandr Nikolayevich Babin, chief project engineer of the State Institute of Planning in River Transport--for the designing and construction of underwater crossings of increased reliability of the Urengoy--Pomary--Uzhgorod transcontinental gas pipeline.

29. Candidate of Economic Sciences Aleksandr Mikhaylovich Storozhinskiy, deputy chief of the Main Administration of the Construction Materials and Construction Assembly Industry attached to the Moscow City Soviet Executive Committee, supervisor of the work; Vitaliy Tikhonovich Antonov, director of the plant of construction paints and cements of the same administration; Vasiliy Andreyevich Bayev, manager of the Republic Rosorggrazhdanstroy Planning and Technological Trust; Candidate of Technical Sciences Vladimir Grigoryevich Batrakov, chief of a sector of the Scientific Research Institute of Concrete and Reinforced Concrete; Doctor of Technical Sciences Vadim Vladimirovich Severnyy, Candidate of Technical Sciences Klavdiya Petrovna Grinevich, chiefs of laboratories of the State Scientific Research Institute of Chemistry and Technology of Elementoorganic Compounds; Doctor of Chemical Sciences Aleksandr Aleksandrovich Zhdanov, chief of a laboratory of the Institute of Elementoorganic Compounds imeni A.N. Nesmeyanov of the USSR Academy of Sciences; Nikolay Grigoryevich Ufimtsev, chief engineer of the Dankov Chemical Plant imeni Academician K.A. Andrianov; Anatoliy Timofeyevich Kholodkov, director of the Zaporozhye Kremniypolimer Plant; Doctor of Technical Sciences Yevgeniy Dmitriyevich Belousov, director of the Scientific Research Institute of Moscow Construction of the Main Administration of Housing anf Civil Construction attached to the Moscow City Soviet Executive Committee--for the development and introduction in construction of a set of composite organosilicon materials.

III. For Textbooks

For Higher Educational Institutions

1. Doctor of Physical Mathematical Sciences Ivan Pavlovich Bazarov, professor of Moscow State University imeni M.V. Lomonosov--for the textbook "Termodinamika" [Thermodynamics], which was published in 1983 (3d edition).

2. Doctor of Technical Sciences Nikolay Petrovich Zakaznov, chief of a chair of the Moscow Higher Technical School imeni N.E. Bauman; Candidates of Technical Sciences Stanislav Ivanovich Kiryushin and Vladimir Ivanovich Kuzichev, docents of the same school; Doctor of Technical Sciences Boris Nikolayevich Begunov--for the textbook "Teoriya opticheskikh sistem" [The Theory of Optical Systems], which was published in 1981 (2d edition).

3. Doctor of Technical Sciences Vadim Mikhaylovich Kudryavtsev, chief of a chair of the Moscow Higher Technical School imeni N.E. Bauman; Doctor of Technical Sciences Vladimir Mikhaylovich Polyayev, professor of the same school; Candidate of Technical Sciences Vyacheslav Danilovich Kurpatenkov, professor of the Moscow Aviation Institute imeni Sergo Ordzhonikidze; Candidate of Technical Sciences Aleksandr Moiseyevich Obelnitskiy, professor of the All-Union Correspondence Machine Building Institute; Vladimir Alekseyevich Kuznetsov, deputy chief of a department of a scientific research

institute; Candidate of Technical Sciences Anatoliy Pavlovich Vasilyev--for the textbook "Osnovy teorii i rascheta zhidkostnykh raketnykh dvigateley" [The Principles of the Theory and Design of Liquid-Propellant Rocket Engines], which was published in 1983 (3d edition).

For Secondary Specialized Educational Institutions

Doctor of Technical Sciences Yuriy Vladimirovich Yakubovksiy, Candidate of Geological Mineralogical Sciences Lev Lvovich Lyakhov, professors of the Moscow Geological Prospecting Institute imeni Sergo Ordzhonikidze--for the textbook "Elektrorazvedka" [Electric Geophysical Prospecting], which was published in 1982 (4th edition).

[Signed] General Secretary of the CPSU Central Committee M. Gorbachev

Chairman of the USSR Council of Ministers N. Ryzhkov

7807
CSO: 1814/67

GENERAL

ASPECTS OF STIMULATION OF SCIENTIFIC, TECHNICAL PROGRESS VIEWED

Moscow DOMESTIC SERVICE in Russian 0900 GMT 16 Nov 85

[From the "Time, Events, People" program; correspondent Yevgeniy Kuznetsov interview with Gennadiy Alekseyevich Krestov, corresponding member of the USSR Academy of Sciences and director of the Ivanovo Institute of the Chemistry of Nonaqueous Solutions; recorded; date and place not given]

[Excerpts] [Krestov] The CPSU draft documents are, of course, documents of very great political significance, but we scientists have welcomed them with great interest also. The fact is that very much is said in these documents about the role of science, about the utilization of science in accelerating scientific-technological progress, and specific paths are mapped out for the resolution of the tasks facing the national economy through the utilization of science.

If it is a matter of basic guidelines of development, then the task is set to increase the role of the Academy of Sciences as the coordinator of scientific research work in the country, to strengthen its responsibility for the establishment of the theoretical foundations of fundamentally new forms of equipment and technology, to give priority to the development of basic science which predetermines the movement of social production onto a qualitatively higher level, and to strengthen the technological orientation of the work of academic institutes.

Thus, working as we do in the system of the Academy of Sciences, we consider that any good basic science should end with a good practical result.

In discovering new facts as it were, new phenomena, basic science clearly shows that there are new ways for the resolution of some practical tasks or others. We see more clearly than most where it is really possible to utilize the results of science which can be more quickly and effectively introduced into production. And in our institute in particular, for example, it is possible to mention dozens of directions where we see that it is possible to create a fundamentally new technology for obtaining substances and materials with the requisite characteristics.

But at this time we are faced with the fact that we are weak in our testing and experimental bases. In order to resolve problems from A to Z, to

facilitate rapid implementation, it is necessary to have a testing and experimental basis. All the same, it seems to me that the main problem is that even the terminology which is used--"implement"--presumes that someone should forcibly press someone to do something. But in essence it turns out that very often, enterprises are not interested in implementing the achievements of science. Why is this? It is because there are no economical incentives, and after all they have to pay wages and to fulfill the plan and so on. And for this reason the difficulty of the problem here consists, of course, in the first instance in there being closer paths of integration of science and production, the establishment of industrial laboratories which envisage the joint responsibility of both scientists and industry for implementing these achievements of science.

[Kuznetsov] Gennadiy Alekseyevich, let's say that amongst great scientists that is all fine, but in many let's call them science workshops, up till now, as it were they do not receive the incentive of even a normal real wage.

[Krestov] Absolutely, I consider that for science today that is a really burning issue. But at the end of the day let's look at it in a simplified way. We prepare cadres by way of postgraduate work. But if a person goes into postgraduate work after finishing a higher educational institution, he gets R80. If he comes from industry, he gets R100, and this is when the average wage in the country is R190 a month. Of course, this does not stimulate progress in this matter.

And taking this further; a person works, let's say as a junior scientific assistant, then his average wage is R150.

[Kuznetsov] So, Gennadiy Alekseyevich, questions related to accelerating scientific-technological progress include the most varied measures, such as the basic wage of a scientific assistant, to more general problems, is that right?

[Krestov] Absolutely, that is, here there should be a harmonious combination both of the working conditions and economic incentives. Certainly the fact also must not be passed over in silence that, unfortunately, today there is a fairly significant divergence between scientific potential and their diversion to jobs for which their qualifications are inappropriate, and people think that a scientist can work anywhere from a vegetable depot to sweeping the street and so on. It is a very serious question, insofar as experience shows that this diversion applies to 30-50 percent. So, in essence, the scientific potential is halved.

There are also problems in the technical equipping of science. That is, I mean the creation of various instruments, highly accurate instruments. There are problems in the use of computers. It is necessary to say that so far, broadly, personal computers have in general not reached the average scientific worker, and this after all sharply increases labor productivity, and it is not coincidental that both in the program and in the basic guidelines enough has been clearly said on this matter.

CSO: 1814/63-F

BIOGRAPHICAL INFORMATION

BRIEFS

BORIS VASILYEVICH YEGOROV OBITUARY--Candidate of Technical Sciences Boris Vasilyevich Yegorov, head of a laboratory of the USSR Academy of Sciences' Institute of Metallurgy imeni Baykov, has died. He was a member of the Communist Party of the Soviet Union and a veteran of the Great Patriotic War. The death announcement is made with deep regret by the institute and its Party bureau and trade-union committee, and condolences are expressed to the family and friends of the deceased. [Text] [Moscow VECHERNAYA MOSKVA in Russian 12 Nov 85 p 4] 7807

CSO: 1814/54 END